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(54) DEVICE AND METHOD FOR REPRODUCTION, RECORDING MEDIUM, AND PROGRAM

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a device that can present user information which is useful in finding the data to be erased, from a recording medium.
SOLUTION: In step S511, it is decided whether the reproduction time of contents data is longer than a specific time T1, and when it is so, an advance to a step S512 is made and a reproduction frequency counter for track objects is made to count up by one. When it is decided at the step S511 that the reproduction time is shorter than the time T, the processing ends. Namely, when the reproduction time is longer than

the time T1, it is considered that contents are produced and the reproduction frequency counter is counted up, but if the user recognizes that, for example, wrong contents are reproduced after the reproduction and stops the reproduction within the time T1, it is considered that the contents are not reproduced, and the reproduction frequency counter does not count up. A list, showing the contents of small reproduction frequency counters in high order, is presented to the user.

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CLAIMS

[Claim(s)]
[Claim 1] The regenerative apparatus characterized by to have a playback means reproduce the data chosen according to actuation by the user in the regenerative apparatus which can reproduce the data recorded on the record medium, a modification means change the count of playback of said data based on the playback time amount by said playback means of said data, and a presentation means show a

user the information which expresses said data based on said count of playback.

[Claim 2] Said modification means is a regenerative apparatus according to claim 1 characterized by making said count of playback increase when said playback time amount is beyond predetermined time.

[Claim 3] Said modification means is a regenerative apparatus according to claim 1 characterized by decreasing said count of playback when said playback time amount is said below predetermined time.

[Claim 4] Said presentation means is a regenerative apparatus according to claim 1 characterized by displaying the identifier of said data on sequence with few said counts of playback.

[Claim 5] The regenerative apparatus according to claim 1 characterized by having further an elimination means to eliminate the data chosen according to actuation by the user from said record medium.

[Claim 6] In the playback approach of the regenerative apparatus which can reproduce the data recorded on the record medium The playback step which reproduces the data chosen according to actuation by the user, The playback approach characterized by including the modification step which changes the count of playback of said data, and the presentation step which shows a user the information showing said data based on said count of playback based on the playback time amount by said playback step of said data.

[Claim 7] In the program of the regenerative apparatus which can reproduce the data recorded on the record medium The playback control step which controls playback of the data chosen according to actuation by the user, The modification control step which controls modification of the count of playback of said data based on the playback time amount in said playback control step of said data, The record medium with which the program which the computer characterized by including the presentation control step which controls the presentation to the informational user showing said data based on said count of playback can read is recorded.

[Claim 8] In the program of the regenerative apparatus which can reproduce the data recorded on the record medium The playback control step which controls playback of the data chosen according to actuation by the user, The modification control step which controls modification of the count of playback of said data based on the playback time amount in said playback control step of said data, The program characterized by making a computer perform processing containing the presentation control step which controls the presentation to the informational user showing said data based on said count of playback.

[Claim 9] In the regenerative apparatus with which only the exclusive application program for reproducing the data recorded on the record medium can start, and said exclusive application program is performed just behind powering on A playback means to reproduce the data chosen according to actuation by the user, The regenerative

apparatus characterized by including a modification means to change the count of playback of said data, and a presentation means to show a user the information showing said data based on said count of playback, based on the playback time amount by said playback means of said data.

[Claim 10] In the regenerative apparatus which can reproduce the contents data recorded on the record medium A playback means to reproduce the contents data chosen according to actuation by the user, The regenerative apparatus characterized by having a modification means to change the count of playback of said contents data, and a presentation means to show a user the information showing said contents data based on said count of playback, based on the playback time amount by said playback means of said contents data.

[Claim 11] In the playback approach of the regenerative apparatus which can reproduce the contents data recorded on the record medium The playback step which reproduces the contents data chosen according to actuation by the user, The playback approach characterized by including the modification step which changes the count of playback of said contents data, and the presentation step which shows a user the information showing said contents data based on said count of playback based on the playback time amount by said playback step of said contents data.

[Claim 12] In the program of the regenerative apparatus which can reproduce the contents data recorded on the record medium The playback control step which controls playback of the contents data chosen according to actuation by the user, The modification control step which controls modification of the count of playback of said contents data based on the playback time amount in said playback control step of said contents data, The record medium with which the program which the computer characterized by including the presentation control step which controls the presentation to the informational user showing said contents data based on said count of playback can read is recorded.

[Claim 13] In the program of the regenerative apparatus which can reproduce the contents data recorded on the record medium The playback control step which controls playback of the contents data chosen according to actuation by the user, The modification control step which controls modification of the count of playback of said contents data based on the playback time amount in said playback control step of said contents data, The program characterized by making a computer perform processing containing the presentation control step which controls the presentation to the informational user showing said contents data based on said count of playback.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention encodes a regenerative apparatus and an approach, a record medium, and the PCM (Pulse Code Modulation) data currently recorded on the list by Music CD, concerning a program, when supplying the coded data accumulated and accumulated in the hard disk to semiconductor memory or a portable device, it is used for it, and it relates to a program at a suitable regenerative apparatus and a suitable approach, a record medium, and a list.

[0002]

[Description of the Prior Art] In the regenerative apparatus which reproduces the data recorded on the record medium, when a user eliminated data without the need from a record medium, the user needed to choose the data which do not have the need based on their storage.

[0003]

[Problem(s) to be Solved by the Invention] That is, in the former, the technical problem which was not provided with information (for example, information which shows the data currently seldom used) for a user to choose data without the need occurred.

[0004] This invention is made in view of such a situation, and it aims at enabling it to provide a user with useful information to choose the data eliminated from a record medium.

[0005]

[Means for Solving the Problem] The 1st regenerative apparatus of this invention is characterized by having a playback means to reproduce the data chosen according to actuation by the user, a modification means to change the count of playback of data based on the playback time amount by the playback means of data, and a presentation means to show a user the information which expresses data based on the count of playback.

[0006] A modification means can make the count of playback increase, when playback time amount is beyond predetermined time.

[0007] A modification means can decrease the count of playback, when playback time amount is below predetermined time.

[0008] A presentation means can display the identifier of data on sequence with few counts of playback.

[0009] An elimination means to eliminate the data chosen according to actuation by the user from said record medium can be established further.

[0010] The 1st playback approach of this invention is characterized by to include the playback step which reproduces the data chosen according to actuation by the user, the modification step which changes the count of playback of data based on the playback time amount by the playback step of data, and the presentation step which

shows a user the information which expresses data based on the count of playback.

[0011] The program of the 1st record medium of this invention carries out containing the playback control step which controls playback of the data chosen according to actuation by the user, the modification control step which control modification of the count of data of playback based on the playback time amount in the playback control step of data, and the presentation control step which control the presentation to the informational user who expresses data based on the count of playback as the description.

[0012] The 1st program of this invention carries out making a computer perform the processing contain the playback control step which controls playback of the data chosen according to actuation by the user, the modification control step which control modification of the count of data of playback based on the playback time amount in the playback control step of data, and the presentation control step which control in the presentation to the informational user who expresses data based on the count of playback as the description.

[0013] The data chosen as the 1st regenerative apparatus of this invention and the approach, and the list in the program according to actuation by the user are reproduced, the count of playback of data is changed based on playback time amount, and a user is shown the information showing data based on the count of playback.

[0014] The 2nd regenerative apparatus of this invention is characterized by to have a playback means to reproduce the contents data chosen according to actuation by the user, a modification means change the count of playback of contents data based on the playback time amount by the playback means of contents data, and a presentation means show a user the information which expresses contents data based on the count of playback.

[0015] The 2nd playback approach of this invention is characterized by to be included the playback step which reproduces the contents data chosen according to actuation by the user, the modification step which change the count of playback of contents data based on the playback time amount by the playback step of contents data, and the presentation step which show a user the information which expresses contents data based on the count of playback.

[0016] The program of the 2nd record medium of this invention carries out containing the playback control step which controls playback of the contents data chosen according to actuation by the user, the modification control step which control modification of the count of contents data of playback based on the playback time amount in the playback control step of contents data, and the presentation control step which control the presentation to the informational user who expresses contents data based on the count of playback as the description.

[0017] The playback control step which controls playback of the contents data with which the 2nd program of this invention was chosen according to actuation by the

user, The modification control step which controls modification of the count of playback of contents data based on the playback time amount in the playback control step of contents data, It is characterized by making a computer perform processing containing the presentation control step which controls the presentation to the informational user showing contents data based on the count of playback.

[0018] The contents data chosen as the 2nd regenerative apparatus of this invention and the approach, and the list in the program according to actuation by the user are reproduced, the count of playback of contents data is changed based on playback time amount, and a user is shown the information showing contents data based on the count of playback.

[0019]

[Embodiment of the Invention] The outline of the audio server which is the gestalt of 1 operation of this invention is explained with reference to drawing 1 . With ATRAC(Adaptive Transform Acoustic Coding)3 method, it encodes, and this audio server 1 records the coded data obtained on a hard disk drive 58 (drawing 6), and from an upper layer side, the PCM (Pulse Code Modulation) data currently recorded on music CD 3 are read, and it manages [the recorded coded data is matched with the object which makes the layered structure of a folder list, a folder, an album, a truck, etc., and] it.

[0020] Two or more folders located in the hierarchy under one step can be included in a folder list. Two or more albums located in the hierarchy under one step can be included in a folder. Two or more trucks located in the hierarchy under one step can be included in an album. The truck located in the lowest layer of a layered structure corresponds to the coded data for one music, and 1 to 1.

[0021] Hereafter, coded data is described to be also contents data. A folder list, a folder, an album, and a truck are described to be also objects. A user specifies an object and orders it various kinds of commands. In addition, about the detail of the layered structure of an object, it mentions later with reference to drawing 38 .

[0022] Moreover, the audio server 1 plays music CD 3, or decodes the coded data currently recorded on the hard disk drive (it is hereafter described as HDD) 58, and outputs the sound signal acquired from a loudspeaker 2.

[0023] Furthermore, the memory stick corresponding to the Magic gate (trademark) where the audio server 1 was inserted in the MS slot 45 (drawing 5) (trademark) As opposed to the portable devices (it is hereafter described as PD) 5, such as 4 and a network Walkman (trademark) connected to a connector 43 (drawing 5), (It is hereafter described as MS) While recording the coded data currently recorded on HDD58 by check-out processing or MUBU out processing, the coded data currently recorded on MS4 or PD5 is recorded on HDD58 by check-in processing, MUBUIN processing, or import processing.

[0024] Here, the Magic gate is a technique for protecting the copyright of data with

two techniques of the data encryption recorded on MS4 corresponding to the Magic gate, and the mutual recognition of the audio server 1 which inserts and uses MS4, and it is possible to prevent the unjust copy of digital audio data, playback, and an alteration. The Magic gate is based on SDMI (Secure Digital Music Initiative) specification.

[0025] In addition, about the audio server 1, and the check-out processing, the check-in processing, the MUBU out processing, MUBUIN processing and import processing between MS4 or PD5, it mentions later.

[0026] MS4 on which the coded data was recorded is taken out from the audio server 1, for example, a personal computer 6 is equipped with it, the coded data currently recorded is read and it is decoded.

[0027] PD5 on which the coded data was recorded decodes coded data, and outputs the sound signal acquired from headphone.

[0028] A remote controller 7 receives the actuation from a user, and transmits a corresponding control signal to the audio server 1.

[0029] Next, the appearance of the audio server 1 is explained with reference to drawing 2 thru/or drawing 5 . Drawing 2 is an external view from the transverse-plane upper part of the audio server 1. Drawing 3 is the plan of the audio server 1. Drawing 4 is the rear view of the audio server 1. Drawing 5 is a front view.

[0030] The lid 40 of CD tray (un-illustrating) equipped with CD is formed in the top face of the audio server 1, and as shown in a lid 40 at drawing 3 , the display 15 which displays various kinds of information besides carbon buttons, such as the power carbon button 11, is arranged. The power (POWER) carbon button 11 is operated when making the power source of the audio server 1 turn on and off. As a sound source, the function (FUNCTION) carbon button 12 is operated, when choosing music CD3 and HDD58, the AUX Inn terminal 31, and 1 of MS4 and PD5.

[0031] The play mode (PLAY MODE) carbon button 13 The Normal playback which reproduces all the trucks included in a playback mode in playback area by a unit of 1 time one by one, The all-songs repeat which repeats carrying out sequential playback of all the trucks included in playback area, The one music repeat which repeats only one truck and is reproduced, the random repeat which repeats choosing at random and reproducing out of all the trucks included in playback area, Or it is operated when changing to the slot machine playback which repeats reproducing the truck chosen while displaying the animation which it seems to choose at random out of all the trucks included in the whole HDD. In addition, about playback area, it mentions later with reference to drawing 71 .

[0032] The display (DISPLAY) carbon button 14 is operated when changing the contents of a display of a display 15. The display 15 which consists of LCD (Liquid Crystal Display) etc. displays the information in connection with a situation of operation or audio data.

[0033] The sound-volume (VOLUME) carbon button 16 is operated when making the sound volume to output fluctuate. The cursor carbon button 17 is operated when moving the cursor displayed on a display 15. The selection (SELECT) carbon button 18 is operated, when choosing the object shown with the cursor of a display 15, or when changing the ascending order at the time of retrieval, and descending order. The erasion (ELASE) carbon button 19 is operated when eliminating objects, such as a truck. The ENTA (ENTER) carbon button 20 is operated when determining objects, such as a menu currently displayed and a truck chosen. A menu / cancellation (MENU/CANCEL) carbon button 21 is operated when [at which it cancels at the time / when] displaying various kinds of actuation menus prepared hierarchical. To MS4 or PD5, the exchange (EXCHANGE) carbon button 22 is operated, when performing check-in processing and check-out processing automatically.

[0034] The record (RECORD) carbon button 23 is operated when recording to HDD58, reproducing the audio data of music CD 3. The high speed record (HI SPEED RECORD) carbon button 24 is operated when carrying out high-speed sound recording of the audio data of music CD 3 at HDD58. In addition, the voice of the audio data recorded also in this case is outputted from a loudspeaker 2 etc. An earth switch 25 is operated when stopping the playback and sound recording under activation. Playback / pause button 26 is operated when directing discharge of reproductive initiation, a playback pause, and a playback pause. The search carbon button 27 is operated when directing search of a current truck or a front truck, or rewinding playback. The search carbon button 28 is operated when directing search of the next truck, or rapid-traverse playback.

[0035] In addition, although illustration is omitted, the carbon button which has a function equivalent to carbon buttons, such as the power carbon button 11 arranged at the lid 40, is arranged at the remote controller 7.

[0036] In the tooth back of the audio server 1, as shown in drawing 4 , the AUX Inn terminal 31, the Rhine out terminal 32, the subwoofer terminal 33, the loudspeaker (L, R) terminal 34, the reset button 35, and DC Inn terminal 36 are arranged.

[0037] The AUX Inn terminal 31 can connect audio output equipment (un-illustrating), and can input the sound signal of the digital audio data from the connected audio output equipment, or an analog. The Rhine out terminal 32 can connect a magnification device (un-illustrating) etc., and can output an analog sound signal to the connected magnification device. The subwoofer terminal 33 can connect a subwoofer (un-illustrating), and can output the low-frequency component of the sound signal reproduced to the subwoofer. The loudspeaker (L, R) terminal 34 can output the sound signal which connected the loudspeaker 2 and was reproduced to the connected loudspeaker 2. A reset button 35 is operated when resetting the audio server 1. DC power from AC power adapter (un-illustrating) is supplied to DC Inn terminal 36.

[0038] As shown in drawing 5 , the opening lever 41, a light sensing portion 42, a connector 43, the access indicator light 44, the MS slot 45, the ejection lever 46, and the phones jack 47 are arranged at the front of the audio server 1. The opening lever 41 is slid when opening a lid 40. A light sensing portion 42 receives the control signal transmitted from a remote controller 7. The USB (Universal Serial Bus) terminal is prepared in the connector 43, and PD5, external HDD, a keyboard, etc. can be connected to it through a USB cable.

[0039] In addition, an IEEE1394 terminal is prepared in a connector 43 and you may make it connect PD5 etc. to it through an IEEE1394 cable. Or the so-called Bluetooth (trademark) or the terminal for IEEE802.11b (the so-called wireless LAN) is prepared, and you may make it connect PD5 etc. by radio.

[0040] An access indicator light 44 blinks, when R/W of data is performed to MS4 inserted in the MS slot 45, or PD5 connected to the connector 43. MS4 is inserted in the MS slot 45. The ejection lever 46 is operated when taking out MS4 inserted in the MS slot 45. A phones jack 47 can connect headphone and can output the sound signal reproduced to the connected headphone.

[0041] Next, the hardware example of a configuration of the audio server 1 is explained with reference to drawing 6 . The audio server 1 builds in Maine (Central Processing Unit) CPU 51 which controls the whole audio server 1. A flash ROM 52, SDRAM53, the USB host controller 54, DMA controller 55, the signal-processing section 60, the (Ethernet R) controller / connector 67, and the PCMCIA controller 68 are connected to Maine CPU 51 through the bus 66.

[0042] If a power source is set to ON, in order to realize RTOS (Real Time Operating System)71 (drawing 7) and various kinds of functions in which starting is immediately completed by Maine CPU 51, the device ID besides the firmware (with reference to Firmware and drawing 7 , it mentions later) performed on RTOS71, the code key, etc. are memorized by the flash ROM 52. SDRAM (Synchronous Dynamic Random Access Memory)53 memorizes predetermined data and a predetermined program temporarily, in case Maine CPU 51 performs various kinds of processings. The USB host controller 54 controls data communication with PD5 connected through a connector 43.

[0043] The DMA (Direct Memory Access) controller 55 controls the data transfer between a buffer 56, CD-ROM drive 57, HDD58, and the encoder/decoder 59. The buffer 56 which consists of a SDRAM etc. buffers temporarily the data with which DMA controller 55 controls a transfer. CD-ROM drive 57 reads the audio data currently recorded on music CD 3 by 8X CAV. HDD58 memorizes the coded data which the encoder / decoder 59 generated.

[0044] An encoder / decoder 59 encodes the PCM data which CD-ROM drive 57 read, and the audio data inputted from the AUX Inn terminal 31 using ATRAC3 method in 132Kbps mode, 105Kbps mode, or 66Kbps mode by a maximum of 8X and an average of 5X, and generates coded data. Moreover, an encoder / decoder 59 decodes the

coded data which HDD58 memorizes. Furthermore, the encoder / decoder 59 has the DES (Data Encryption Standard) engine, and enciphers it using the code key which resembles the device ID of predetermined components and time of day which constitute the audio server 1, is based and generates coded data.

[0045] For example, when it has the capacity whose HDD58 is 9 G bytes and an encoder / decoder 59 encodes by ATRAC3 method in 105Kbps mode, to HDD58, the music CD 3 (60 minutes/(sheet)) for about 100 sheets can be recorded.

[0046] the signal-processing section 60 -- the Magic gate memory stick interface (it is hereafter described as MGMS I/F) 60-1, and water Marks -- clean (it is hereafter described as WM screen) -- it consists of 60-2, audio I/F 60-3, and a sampling rate converter (it is hereafter described as solvent refined coal) 60-4.

[0047] MGMS I/F 60-1 performs mutual recognition to MS4 inserted in the MS slot 45 through the MS connector 61, and performs a data encryption and the enciphered decode of data based on the result. The WM screen 60-2 detects the water marks (information which shows the propriety of an electronic watermark and a copy etc.) of SDMI specification currently embedded to the audio data which pass the signal-processing section 60.

[0048] Audio I/F 60-3 acquires digital audio data through the AUX Inn terminal 31, and supplies them to solvent refined coal 60-4. Moreover, after the audio interface 60-3 buffers suitably the digital audio data transmitted from the buffer 56 etc. in the buffer 251 (drawing 62) to build in, it is outputted to AD/DA62.

[0049] solvent refined coal 60-4 changes the sampling rate of the digital audio data from audio I/F 60-3 into 44.1kHz, and outputs it to an encoder / decoder 59.

[0050] In addition, although illustration is omitted, the signal-processing section 60 builds in further the encoder/decoder of ATRAC3 method which operates by 1X.

[0051] The MS connector 61 relays the data communication of MS4 and MGMS I/F 60-1 which are inserted. AD/DA62 changes into the sound signal of an analog the digital audio data inputted from audio I/F 60-3 of the signal-processing section 60, and outputs them to the Rhine out terminal 32, the loudspeaker terminal 34, or a phones jack 47. Moreover, AD/DA62 digitizes the sound signal of an analog inputted from the AUX Inn terminal 31, and outputs it to an encoder / decoder 59.

[0052] (Ethernet R) controller / connector 67 controls data communication with other electronic equipment through Ethernet (trademark). The PCMCIA (Personal Computer Memory Card International Association) controller 68 is . [0053] which has equipped the IC card interface of PCMCIA specification. The display driver 63 and the factice CPU 64 are connected to Maine CPU 51. A display driver 63 controls the display of a display 15. Especially, a factice CPU 64 performs detection of actuation to control of a power supply section 65, the reset control of a body, the count of an internal clock, the power carbon button 11, etc., control of a light sensing portion 42, control of AD/DA62, etc., when a power source is off. A power supply section 65 transforms into

a predetermined electrical potential difference DC electrical potential difference supplied from DC Inn terminal 36, and supplies the whole audio server 1.

[0054] Next, in order to actually function the next audio server 1, the firmware which Maine CPU 51 reads from a flash ROM 52, and is performed is explained with reference to drawing 7 . In addition, the function of the audio server 1 is later mentioned with reference to drawing 47 thru/or drawing 56 about correspondence with the detail and firmware, although it is CD ripping, CD recording, HD recording (digital input), HD recording (analog input), HD play, CD play, MS play, check-out/check-in, import, MUBU out / MUBUIN, etc.

[0055] Firmware is making the layer 72 whose number is four, i.e., an application layer, (APP), the upper-middle wear layer (UMW) 73, the ROWA middleware layer (LMW) 74, and the device driver layer (DD) 75.

[0056] Each module of the Maine application (it is hereafter described as Maine APP) 76, the hard disk application (it is hereafter described as HD APP) 77, the CD application (it is hereafter described as CD APP) 78, the memory stick application (it is hereafter described as MS APP) 79, the portable device application (it is hereafter described as PD APP) 80, and the conversion-of-kana-into-kanji application (it is hereafter described as FEP (Front End Processor)) 81 is contained in an application layer 72.

[0057] Each module of an application layer 72 requires processing of the module with which the upper-middle wear layer 73 corresponds corresponding to actuation of the user in connection with the function in which the audio server 1 can be performed, and offers a user interface by controlling the display of the situation of processing.

[0058] Maine APP76 controls each module of an application layer 72. For example, a starting screen is created at the time of starting, and each module is started. The actuation of a user notified from input middleware 97 is received, and is notified to a corresponding module. The indicative data from each module is supplied to the display device driver 105. The change of each module is performed. Corresponding to actuation of sound-volume modification from a user, it notifies to audio IO middleware (AIO) 94. Corresponding to the setup actuation from a user, the set point is notified to each module. Common setting information (play mode etc.) is held by each module. Each module is terminated corresponding to actuation of power-off, and power-off is required of system-control middleware (SYSTEM) 98.

[0059] HD APP77 receives actuation of making HDD58 driving, notifies it to hard disk middleware 82, acquires the operating state of hard disk middleware 82, and generates an indicative data.

[0060] CD APP78 receives actuation of making CD-ROM drive 57 driving, notifies it to CD middleware 88, acquires the operating state of CD middleware 88, and generates an indicative data.

[0061] MS APP79 receives the actuation in connection with MS4 inserted in the MS

slot 45, notifies it to MS middleware 89, acquires the operating state of MS middleware 89, and generates an indicative data.

[0062] PD APP80 receives the actuation in connection with PD5 connected to the connector 43, notifies it to PD middleware 90, acquires the operating state of PD middleware 90, and generates an indicative data.

[0063] FEP81 performs the conversion of kana into kanji at the time of inputting the title of the music CD 3 to record etc.

[0064] It consists of modules of the following which modeled and mounted each function of the audio server 1 in the upper-middle wear layer 73. That is, each module of hard disk middleware (it is hereafter described as HD MW) 82, CD middleware (it is hereafter described as CD MW) 88, MS middleware (it is hereafter described as MS MW) 89, and PD middleware (it is hereafter described as PD MW) 90 is contained.

[0065] HD MW82 cooperates with HDCC83 and CDMW88 which manage the coded data memorized by HDD58, and compresses the audio data of music CD 3. CD RIPPING84 which is enciphered and is recorded on HDD58, and the coded data which cooperates with audio IO middleware 94 and is recorded on HDD58 are decoded. HD PLAY85 to elongate and the audio data which cooperate with audio IO middleware 94 and are inputted from the AUX Inn terminal 31 are compressed. It cooperates with HD REC86, MS MW89, or PD MW90 which is enciphered and is recorded on HDD58, and consists of C IN/C OUT87 which controls check-in with MS4 or PD5, and check-out.

[0066] CD MW88 realizes the function as a CD player by making the CD device driver 102 control CD-ROM drive 57. MD MW89 cooperates with audio IO middleware 94 and MS file system middleware 95, and realizes the function as an MS player. PD MW90 controls PD5 by cooperating with USB host middleware 96 and the USB host device driver 104.

[0067] The module of the following which modeled and mounted the function which can share each module of the upper-middle layer 73 in the ROWA middleware layer 74, Namely, hard disk object database middleware 91, hard disk file system middleware (It is hereafter described as HD DB) (Hereafter) HD 92, MGR middleware which are described to be FS 93, audio IO middleware (AIO) 94, memory stick file system middleware (MS FS) 95, USB host middleware (USB) 96, input handle middleware 97 (INPUT), (MGR) And system-control middleware (SYSTEM) 98 is contained. Each module contained in the ROWA middleware layer 74 is called from each module which constitutes the upper-middle layer 73.

[0068] The module 99, i.e., the hard disk device driver, the decoder / encoder device driver 100, the DMA device driver 101, the CD device driver 102, the signal-processing section device driver 103, the USB host device driver 104, the display device driver 105, the audio device driver 106, the key device driver 107, the power device driver 108, and the clock device driver 109 of the following which modeled each hardware device are contained in the device driver layer (DD) 75. In

addition, in drawing 7 , the audio device driver 106 thru/or the clock device driver 109 surrounded with the broken line is performed by the factice CPU 64. Each module mainly consists of libraries and the API (Application Program Interface) is called from the module contained in the upper-middle wear layer 73 or ROWA middleware 74.

[0069] Next, the FAT (File Allocation Table) mold file system (data format) applied to HDD58 is explained with reference to drawing 8 thru/or drawing 20 . As shown in drawing 8 , the object record section 122 where an object including the information for pinpointing the location where the contents data recorded on the file record section 121 and the file record section 121 for recording coded data (contents data) as a file were recorded is recorded is established in HDD58.

[0070] The file management section 123 performs all processings in connection with [write in and] files, such as read-out and deletion, to issue of ID to creation of a file, and the file created newly, and the file record section 121. The file management section 123 is equivalent to HD FS92 contained in the ROWA middleware layer 74.

[0071] The object management section 124 recognizes the physical location of the object in the object record section 122, and performs writing of an object, read-out, deletion, etc. The object management section 124 is equivalent to HD DB91 contained in the ROWA middleware layer 74. In addition, about management by the database of an object, it mentions later with reference to drawing 21 thru/or drawing 37 .

[0072] Drawing 9 shows the logical structure of the file record section 121. The file record section 121 is divided by the sector of a predetermined capacity which it writes in and is the smallest unit of read-out in the file record section 121. The serial sector number is given to all sectors. The file record section 121 is constituted by the FAT area constituted by a predetermined number of sectors, a system area, and two or more clusters. The fixed-length cluster number is given to each cluster. Two or more clusters are combined and the file recorded on the file record section 121 is constituted.

[0073] The integrated state of two or more clusters is recorded on the table called FAT141 (drawing 10). Although FAT141 is recorded on the FAT area of the file record section 121, in case the file management section 123 operates, it is transmitted also to SDRAM53.

[0074] Drawing 10 shows the structure of FAT141. FAT141 consists of a FAT header 142 and two or more FAT entries 144 which correspond to each cluster, respectively. The empty cluster list initiation number record section 143 is included in the header 142. The cluster number of the head of a series of empty clusters where data are not recorded is recorded on the empty cluster list initiation number record section 143. When an empty cluster does not exist, -1=0xFFFFFFFF is recorded on the empty cluster list initiation number record section 143.

[0075] The same entry number as the cluster number given to the corresponding cluster is given to the FAT entry 144. For example, the entry number 1 is given to the

FAT entry corresponding to a cluster number 1. Hereafter, FAT entry E (1) describes the FAT entry of the entry number 1. The FAT entry 144 is kicked by the P column 145 and the N column 146 by the division.

[0076] The cluster number given to the cluster connected ahead of a corresponding cluster is recorded on the P column 145 of the FAT entry 144. When the cluster connected ahead does not exist (i.e., when a corresponding cluster is the head of a file), 0xFFFFFFFF is recorded on the P column 146.

[0077] The cluster number given to the cluster connected behind a corresponding cluster is recorded on the N column 146 of the FAT entry 144. When the cluster connected back does not exist (i.e., when a corresponding cluster is the tail of a file), 0xFFFFFFFF is recorded on the N column 146.

[0078] For example, when only one file is recorded on five clusters to which cluster numbers 1, 5, 6, 8, and 12 are given by the file record section 121, as shown in drawing 11 In the P column of FAT entry [of the entry number 1 (0x00000001)] E (1) 0xFFFFFFFF which shows that the cluster connected ahead does not exist is recorded, and the cluster number 5 (0xFFFFFFFF) given to the cluster connected back is recorded on the N column.

[0079] The cluster number 1 (0x00000001) given to the cluster connected ahead is recorded on the P column of FAT entry [of the entry number 5 (0x00000005)] E (5), and the cluster number 6 (0x00000006) given to the cluster connected back is recorded on the N column.

[0080] Record is similarly made by FAT entry [of the entry numbers 6 and 8] E (6), and E (8).

[0081] The cluster number 8 (0x00000008) given to the cluster connected ahead is recorded on the P column of FAT entry [of the entry number 12 (0x0000000C)] E (12), and 0xFFFFFFFF which shows that the cluster connected back does not exist is recorded on the N column.

[0082] The cluster number (0x00000002) which a series of clusters from the cluster of a cluster number (0x00000002) to a cluster number (0x00000014) are vacant in now, and shows the head since it is a cluster is recorded on the empty cluster list initiation number record section 143.

[0083] Drawing 12 shows signs that one file is recorded on five clusters to which cluster numbers 1, 5, 6, 8, and 12 are given. The size record section 151 which records the information with which the size of a file is concerned is established in the cluster (in the case of now cluster 1) of the head of a file. The data of a file are recorded after the 2nd cluster (in the case of now cluster 5). In addition, you may make it establish the size record section 151 in the cluster at the tail end of a file (in the case of now cluster 12).

[0084] Drawing 13 shows the example of a configuration of the size record section 151. The effective size record section 152, the last cluster number record section 153,

and the number record section 154 of occupancy clusters are established in the size record section 151. The number of valid bytes of the cluster at the tail end (in the case of now cluster 12) is recorded on the effective size record section 152. Usually, the value is one or more and the value below cluster size is recorded. The cluster number (in the case of now 0x0000000C) of the cluster at the tail end (in the case of now cluster 12) is recorded on the last cluster number record section 153. The number of the clusters which constitute the data-logging part of a file (in the case of now 4) is recorded on the number record section 154 of occupancy clusters.

[0085] Next, creation processing (namely, record processing of contents data) of the file using FAT, read-out processing of a file, and reverse read-out (namely, read-out processing from the hard flow of contents data) of a file are explained with reference to the flow chart of drawing 14 thru/or drawing 20 . In addition, these processings are controlled by HD FS92 belonging to the file management section 123 74, i.e., the ROWA middleware layer of firmware.

[0086] Introduction and creation processing of a file are explained with reference to the flow chart of drawing 14 . HD FS92 makes the contents data recorded on HDD58 transmit to a buffer 56 from the CM-ROM drive 57 etc. for every cluster size in step S1 (the transmitted amount of data is made into S bytes). In step S2, HD FS92 searches and acquires the empty cluster of the file record section 121 (reservation).

[0087] This empty cluster acquisition processing is explained with reference to the flow chart of drawing 15 . In step S21, HD FS92 reads the value Q currently recorded on the empty cluster list initiation number record section 143 currently recorded on the FAT header 141. In step S22, Q is a value -1 or HD FS92 judges whether an empty cluster exists. When Q was not a value -1, i.e., judged with an empty cluster existing, processing progresses to step S23. In step S23, HD FS92 reads FAT entry E (Q) corresponding to a value Q (cluster number of an empty cluster).

[0088] In relation to the processing which reads FAT entry E (Q), the processing which reads FAT entry E (X) corresponding to cluster number X of arbitration is explained with reference to the flow chart of drawing 16 . In step S41, it computes Address A by HD FS92 adding known FAT header size to a known FAT entry starting address, and adding the product which carried out the multiplication of the known entry size to the value (X-1) which subtracted 1 from the value X to the sum. In step S42, HD FS92 reads data by 1 entry size by making Address A into a head. As mentioned above, explanation of the processing which reads FAT entry E (X) corresponding to cluster number X of arbitration is ended.

[0089] In return and step S24, HD FS92 judges whether the value of the N column of FAT entry E (Q) is -1 (0xFFFFFFFF) to drawing 15 . When judged with the value of the N column of FAT entry E (Q) not being -1, processing progresses to step S25.

[0090] In step S25, HD FS92 assigns the value of the N column of FAT entry E (Q) to Variable M. In step S26, HD FS92 reads FAT entry E (M) corresponding to cluster

number M. In step S27, HD FS92 records −1 (0xFFFFFFFF) on the P column of FAT entry E (M).

[0091] In step S28, HD FS92 records −1 (0xFFFFFFFF) on the N column of FAT entry E (Q), and records −1 (0xFFFFFFFF) on the P column of FAT entry E (Q). In step S29, the return of HD FS92 is carried out to drawing 14 noting that the empty cluster of cluster number Q exists. As mentioned above, explanation of empty cluster acquisition processing is ended.

[0092] In addition, in step S24, when judged with the value of the N column of FAT entry E (Q) being −1, processing of step S25 thru/or step S27 is skipped.

[0093] Moreover, in step S22, when judged with Q being the value −1 currently recorded on the empty cluster list initiation number record section 143, processing progresses to step S30. In step S30, the return of HD FS92 is carried out to drawing 14 noting that an empty cluster does not exist. However, file creation processing of drawing 14 is ended noting that HDD58 is full, when an empty cluster does not exist.

[0094] The empty cluster of acquired cluster number Q is hereafter read as the empty cluster of cluster number V, and explanation is continued. In step S3, HD FS92 is vacant in Variable X and Variable A, and substitutes cluster number V of a cluster. In step S4, HD FS92 substitutes 0 for the number T of occupancy clusters. In step S5, HDFS92 newly acquires an empty cluster like processing of step S2 mentioned above. It is vacant and the acquired cluster number which is a cluster is set to V. Here, when an empty cluster cannot newly be acquired, this file creation processing is ended.

[0095] In step S6, HD FS92 assigns a value V to Variable B. In step S7, HD FS92 increments the number T of occupancy clusters only for 1. In step S8, HD FS92 changes cluster number B into a sector number (for example, as shown in drawing 9 , when the sector and the cluster are matched, a cluster number 2 is changed into a sector number 28 thru/or 35). The sector number corresponding to cluster number B is distinguished. HD FS92 is made to record on the sector number from which the file record section 121 changed the contents data buffered at step S1 in step S9.

[0096] After record of the buffered contents data is completed, in step S10, HD FS92 connects the cluster of cluster number B with the cluster (in this time, it is vacant and a cluster) of cluster number A. This connection processing is explained with reference to the flow chart of drawing 17 .

[0097] Like the processing mentioned above with reference to drawing 16 , in step S51, HD FS92 reads FAT entry E (A) corresponding to cluster number A, and reads FAT entry E (B) corresponding to cluster number B in step S52. In step S53, HD FS92 records cluster number B on the N column of FAT entry E (A), and records cluster number A on the P column of FAT entry E (B). In addition, processing of step S53 is performed to FAT141 developed to SDRAM53. As mentioned above, explanation of connection processing of the cluster of cluster number A and the cluster of cluster number B is ended.

[0098] In return and step S11, it judges whether HD FS92 has amount-of-data S of the contents recorded by step S9 equal to cluster size to drawing 14 . Since record of the contents data which should be recorded is not completed when it judges that amount-of-data S of the contents recorded by step S9 is equal to cluster size, processing progresses to step S12.

[0099] A continuation of the contents data recorded previously is made to transmit to a buffer 56 by cluster size in step S12. Cluster number B is substituted for Variable A in step S13. In step S14, HD FS92 newly acquires an empty cluster like processing of step S2 mentioned above. It is vacant and the acquired cluster number which is a cluster is set to V. In addition, at step S14, when an empty cluster is not newly able to be acquired, processing progresses to step S17. In step S15, HD FS92 assigns a value V to Variable B. In step S16, HD FS92 increments the number T of occupancy clusters only for 1.

[0100] Then, as for processing, return and subsequent processings are repeated by step S8. And in step S11, since record of the contents data which should be recorded was completed when it judged that amount-of-data S of the contents recorded by step S9 is not equal to cluster size, processing progresses to step S17.

[0101] In step S17, HD FS92 establishes the size record section 151 in the empty cluster of cluster number X acquired at step S2, records amount-of-data S recorded on the effective size record section 152 at the cluster at the tail end, records the value of Variable B on the last cluster number record section 153, and records the value of Variable T on the number record section 154 of occupancy clusters.

[0102] In step S18, FAT141 currently recorded on the FAT area of the file record section 121 is updated by FAT141 rewritten by processing of step S10. As it explained above, a file is newly created. In addition, the file identification child of the same value as the cluster number of the head of a series of clusters where contents data were recorded is published by the created file.

[0103] Next, read-out processing of a file (it is hereafter described as File X) in which a file identification child is X is explained with reference to the flow chart of drawing 18 . In step S61, HD FS92 performs retrieval processing for distinguishing whether File X exists.

[0104] Retrieval processing of File X is explained with reference to the flow chart of drawing 19 . In step S81, HD FS92 acquires FAT entry E (X) corresponding to the entry number X. In step S82, HD FS92 judges whether the value of the P column of FAT entry E (X) is -1 (0xFFFFFFFF). When judged with the value of the P column of FAT entry E (X) being -1, processing progresses to step S83. In step S83, since the cluster of the entry number X (= cluster number X) is a cluster of the head of a series of clusters on which the file is recorded, HD FS92 judges that File X exists, and returns to file read-out processing of drawing 18 .

[0105] When it is judged with the value of the P column of FAT entry E (X) not being

−1 in step S82 on the contrary, processing progresses to step S84. In step S84, since the cluster of the entry watch X (= cluster number X) is not a cluster of the head of a series of clusters on which the file is recorded, HD FS92 judges that File X does not exist, and returns to file read-out processing of drawing 18 . As mentioned above, explanation of retrieval processing of File X is ended.

[0106] Explanation is continued noting that it is hereafter judged in file search processing that File X exists. In step S62, HD FS92 judges whether the value of the N column of FAT entry E (X) is −1 (0xFFFFFFFF). Since data do not exist in File X when judged with the value of the N column of FAT entry E (X) being −1, read-out processing is ended.

[0107] In step S62, the processing whose value of the N column of FAT entry E (X) is not −1 progresses to step S63. In step S63, HD FS92 changes cluster number X (top cluster) into a sector number. HD FS92 reads the size record section 151 currently recorded on the sector number which controlled and changed DMA controller 55, and a buffer 56 is made to buffer it in step S64. In step S64, HD FS92 reads the effective size S (amount of data currently recorded on the cluster at the tail end of a series of clusters on which File X is recorded) currently recorded on the effective size record section 152 of the size record section 151 which carried out the buffer link at step S63.

[0108] In step S66, HD FS92 assigns the value of the N column of FAT entry E (X) to Variable C. In step S67, HD FS92 reads FAT entry E (C) corresponding to the 2nd cluster corresponding to cluster number C like the processing mentioned above with reference to drawing 16 . In step S68, HD FS92 changes cluster number C into a sector number. HD FS92 reads the contents data for one cluster currently recorded on the sector of the sector number which controlled and changed DMA controller 55, and a buffer 56 is made to buffer it in step S69.

[0109] In step S70, HD FS92 judges whether the value of the N column of FAT entry E (C) is −1 (0xFFFFFFFF). When judged with the value of the N column of FAT entry E (C) not being −1, processing progresses to step S71. HD FS92 controls DMA controller 55, and makes all the data that the buffer 56 buffers output to an encoder / decoder 59 in step S71. Since all the contents data of File X are not read yet, processing progresses to step S72. In step S72, HD FS92 assigns the value of the N column of FAT entry E (C) to Variable C. As for processing, return and subsequent processings are repeated by step S67.

[0110] Then, in step S70, since read-out from the cluster at the tail end where the contents data of File X are recorded was completed when judged with the value of the N column of FAT entry E (C) being −1, processing progresses to step S73. HD FS92 controls DMA controller 55, and makes the data for effective-data size S minutes which the buffer 56 buffers and which are the tail end of contents data output to an encoder / decoder 59 in step S73.

[0111] In addition, in file search processing of step S61, when it is judged that File X does not exist, processing progresses to step S74, an error judging is made, and file read-out processing of File X is ended. As mentioned above, explanation of read-out processing of File X is ended.

[0112] Next, reverse read-out processing of File X is explained with reference to the flow chart of drawing 20 . Here, reverse read-out processing is the processing which can be used when going back and reproducing the contents data for example, whose playback time amount is for 100 seconds for for [every] several seconds so that only 100 ms extent may be reproduced from the 80th second, next only 100 ms extent may be reproduced from the 70th second after only 100 ms extent is reproduced from the 90th second.

[0113] In step S91, HD FS92 changes the file identification child (it is described as ID (X) =X and the following) of File X into a sector number. However, ID (X) is the same as that of the cluster number of a top cluster among a series of clusters on which File X is recorded.

[0114] In step S92, FAT entry E (X) corresponding to Cluster X is read. HD FS92 controls DMA controller 55, reads the size record section 151 currently recorded on the sector of the sector number changed at step S91, and a buffer 56 is made to buffer it in step S93. In step S94, HD FS92 reads last cluster number Z in the last cluster number record section 153 for the effective size record section 152 of the size record section 151 which carried out the buffer link at step S93 to the effective size S.

[0115] In step S95, HD FS92 judges whether the last cluster numbers Z and ID (X) are the same. Since contents data do not exist in File X when it judges that the last cluster numbers Z and ID (X) are the same, reverse read-out processing is ended.

[0116] When it judges that the last cluster numbers Z and ID (X) are not the same, processing progresses to step S96. In step S96, HD FS92 changes last cluster number Z into a sector number. HD FS92 controls DMA controller 55, and reads the data containing the part at the tail end of the contents data currently recorded on the sector number changed at step S96, and a buffer 56 is made to buffer it in step S97. HD FS92 controls DMA controller 55, and makes S bytes of the data buffered with the buffer 56, i.e., the part at the tail end of contents data, output to an encoder / decoder 59 in step S98.

[0117] In step S99, HD FS92 reads FAT entry E (Z) corresponding to last cluster number Z. In step S100, it judges whether the value of the P column of FAT entry E (Z) of HD FS92 is the same as that of ID (X). Since it means that the contents data of File X were recorded only on one cluster at the tail end when judged with the value of the P column of FAT entry E (Z) being the same as that of ID (X), reverse read-out processing is ended.

[0118] When judged with the value of the P column of FAT entry E (Z) not being the

same as that of ID (X), in order to go back by one cluster and to read from a tail end side, processing progresses to step S101. In step S101, HD FS92 assigns the value of the P column of FAT entry E (Z) to Variable C.

[0119] In step S102, HD FS92 reads FAT entry E (C) corresponding to cluster number C. In step S103, HD FS92 changes cluster number C into a sector number. HD FS92 controls DMA controller 55, and reads the contents data currently recorded on the sector number changed at step S103, and a buffer 56 is made to buffer it in step S104. HD FS92 controls DMA controller 55, and makes the contents data for one cluster buffered with the buffer 56 output to an encoder / decoder 59 in step S105.

[0120] In step S106, it judges whether the value of the P column of FAT entry E (C) corresponding to cluster number C of HD FS92 is the same as that of ID (X). In order to go back by one cluster and to read since all the files X will be read when judged with the value of the P column of FAT entry E (C) not being the same as that of ID (X), processing progresses to step S107. In step S107, HD FS92 assigns the value of the P column of FAT entry E (C) to Variable C. Return and processing after it change processing to step S102, and it is carried out.

[0121] Then, in step S106, since it means reading File X altogether to a head when it judges that the value of the P column of FAT entry E (C) is the same as that of ID (X), reverse read-out processing is ended. As mentioned above, explanation of reverse read-out processing of File X is ended.

[0122] Since the cluster number of the head cluster of the field where the file is recorded which is a fixed-length value as a file identification child for specifying a file was given according to HD FS92 of the audio server 1 as explained above, the record location of a file can be pinpointed easily. Therefore, compared with the case where a file name is not a fixed length, the retrieval time of a file can be reduced sharply.

[0123] Moreover, when a file identification child is a fixed length, the time amount which retrieval of a file takes can be equalized.

[0124] Moreover, since there is no limit in the size of a file to record according to HD FS92 of the audio server 1, the data of bigger size not only like audio data but a video data are recordable as a file.

[0125] Moreover, since according to HD FS92 of the audio server 1 a cluster is used for the forward direction when continuing and recording one file on the cluster of a division negative value, at the time of record and playback, seeking serves as the fixed direction. Therefore, generating of skipping at the time of the leakage in record and playback at the time of record is inhibited.

[0126] Next, the object corresponding to a folder, an album, or a truck is explained with reference to drawing 21 thru/or drawing 27 . Drawing 21 shows the logical structure of the object record section 122 where an object is recorded. The object record section 122 consists of a system area 161 and two or more chunks divided by predetermined capacity. An object is recorded on a chunk.

[0127] The header 162, the object mold record section 163, and the field information record section 164 are established in the system area 161. In two or more chunks, the chunk by which the chunk to which the serial number after one is given in an order from the head, and to which the number 1 is given the following is given to the chunk 1 and the number 2 is described to be a chunk 2 etc.

[0128] The chunk is divided by the page of a further predetermined capacity. To the page which constitutes a chunk, the page by which the page to which the serial number after zero is given in an order from the head, and to which the number 0 is given the following is given to the page 0 and the number 1 is described to be a page 0 etc.

[0129] Drawing 22 shows the structure of the object mold record section 163 of a system area 161. It consists of a header 165 and T entries. T is a constant set up beforehand. The number record section 166 of entries is established in the header 165. The number of the entries registered now (maximum is T) is recorded on the number record section 166 of entries.

[0130] The size record section 167, the basic object mold number record section 168, and the parameter record section 169 are established in each entry of the object mold record section 163. For example, the information about the object mold number t is recorded on Entry t. That is, the size of the object of the object mold number t is recorded on the size record section 167 of Entry t. The basic object mold number which shows the basic object mold with which the object of the object mold number t belongs is recorded on the basic object mold number record section 168 of Entry t. The information about size in case the size of the object of the object mold number t is variable length is recorded on the parameter record section 169 of Entry t.

[0131] Drawing 23 shows the field information record section 164 of a system area 161. The field information record section 164 consists of bit strings of the page total (value which carried out the multiplication of the pagination which constitutes one chunk to the total of a chunk) of the object record section 122. However, drawing 23 shows the expedient top of explanation, and the field information record section 164 using the matrix of a train (total of chunk) x (pagination which constitutes one chunk) line. For example, in drawing 23 , when the bit shown by "O" of q train of p lines is equivalent to the page p of Chunk q and the page p of Chunk q is using it, 1 is recorded on the bit shown by "O." On the contrary, when the page p of Chunk q is not using [be / it] it, 0 is recorded on the bit shown by "O."

[0132] Drawing 24 shows the example of a configuration of the object management section 124 equivalent to HD DB91 contained in the ROWA middleware layer 74. The object management section 124 consists of the object mold registration section 171, the storage region Management Department 172, the session management section 173, and the cache Management Department 174.

[0133] The object mold registration section 171 registers an object mold (writing to

the object mold record section 163). Moreover, the object mold registration section 171 performs the response (read-out from the object mold record section 163) to an inquiry of an object mold.

[0134] The predetermined bit of the field information record section 164 reverses the storage region Management Department 172. Moreover, the storage region Management Department 172 searches the continuation free space of predetermined pagination by reading the bit of the field information record section 164. Furthermore, the storage region Management Department 172 publishes an identifier to each object.

[0135] The session management section 173 manages the session management information 181 (drawing 25) while publishing a session number to the session under present activation. Here, a session is vocabulary which shows the processing which controls the writing of data, read-out, etc.

[0136] Drawing 25 shows the example of a configuration of the session management information 181. The session management information 181 corresponds to the number storing field 182 of current sessions where the number of the sessions opened now (it is hereafter described as the number of current sessions) is stored, and each object, and consists of S entries on which the information on the session which holds the access privilege is recorded. The maximum and the value S of the number of current sessions are set up beforehand.

[0137] The object identifier storing field 183, the read/write session number storing field 184, the read-only session number storing field 185 or 188, the object condition storing field 189, the lead cache address storing field 190, the write cache address storing field 191, and the access time-of-day storing field 192 are established in the entry of the session management information 181.

[0138] The object identifier (drawing 27) of a corresponding object is stored in the object identifier storing field 183. The session number of the session which has a write right to a corresponding object is stored in the read/write session number storing field 184. The session number of the session which has a read-out right to a corresponding object is stored in the read-only session number storing field 185 thru/or 188. In addition, two or more sessions which have a read-out right to an object may exist in coincidence, and if drawing 25 has a read-out right to four, it shows the case where it has one writing and a read-out right.

[0139] The information ("CREATE" which shows creation, "UPDATE" which shows updating, or "REMOVE" which shows deletion) which shows the condition of a corresponding object is stored in the object condition storing field 189. The address of the lead cache which makes the object to read memorize temporarily is stored in the lead cache address storing field 190. The address of the write cache which makes the object to write in memorize temporarily is stored in the write cache address storing field 191. The last access time of day to a corresponding object is stored in the access time-of-day storing field 192.

[0140] In addition, 0 is stored when the information which should be stored in the object identifier storing field 183 thru/or the access time-of-day storing field 192 does not exist.

[0141] Drawing 26 shows the example of a configuration of basic object the 1 mold and basic object the 2 mold which is recorded on a chunk and which are two kinds of basic object molds of an object.

[0142] Basic object the 1 mold consists of an object identifier record section 201 where the object identifier of self is recorded, and an arbitration data storage area 202 where the data (for example, data, such as an identifier of the object which a user sets up) of arbitration are recorded, as shown in drawing 26 (A). A folder list, a folder, and the object of an album are contained in basic object the 1 mold.

[0143] Basic object the 2 mold consists of an object identifier record section 201 where the object identifier of self is recorded, an arbitration data storage area 202 where the data of arbitration are recorded, and a file identification child record section 203 where the file identification child of the file corresponding to self (object) is recorded, as shown in drawing 26 (B). The object of a truck is contained in basic object the 2 mold.

[0144] The object identifier recorded on the object identifier record section 201 consists of a chunk number which shows the head which are a series of pages on which the corresponding object is stored in drawing 27 so that it may be shown, its page number, and a mold number. A mold number consists of a basic object mold number (basic object the 1 mold or basic object the 2 mold on the other hand) to which a corresponding object belongs, and an entry number of the object mold record section 163 where the corresponding object type is registered.

[0145] Next, creation processing of an object, retrieval processing of an object, an update process of an object, creation processing of a stream object, and retrieval processing of a stream object are explained with reference to the flow chart of drawing 28 thru/or drawing 37 . Here, especially stream objects are the contents data recorded on the file record section 121 and the object corresponding to 1 to 1, i.e., the vocabulary which points out a truck. A stream object belongs to basic object the 2 mold (drawing 26 (B)). Therefore, the object which is not a stream object is an object of a folder or an album, and belongs to basic object the 1 mold.

[0146] In addition, these processings are controlled by HD DB91 belonging to the object management section 124 74, i.e., the ROWA middleware layer of firmware.

[0147] The case where the object of the object mold number t is created is explained to an example with reference to the flow chart of drawing 28 about creation processing of the object which are not introduction and a stream object. In addition, as shown in drawing 27 , the prototype number (in the case of now basic object the 1 mold) and the entry number are contained in the object mold number t.

[0148] In step S121, HD DB91 establishes a light session. The processing which

establishes a light session is explained with reference to the flow chart of drawing 29 . In step S141, HD DB91 reads the number of current sessions stored in the number storing field 182 of current sessions of the session management information 181, and judges whether the read number of current sessions is smaller than the maximum set up beforehand. When it judges that the number of current sessions is smaller than the maximum set up beforehand, processing progresses to step S142.

[0149] In step S142, only 1 increments the number of current sessions with which HD DB91 is stored in the number storing field 182 of current sessions of the session management information 181. In step S143, HD DB91 establishes a light session, for example, publishes the session number Z with a random number etc. Processing returns to drawing 28 .

[0150] In addition, in step S141, since a session cannot be further established when it judges that the number of current sessions is not smaller than the maximum set up beforehand, processing progresses to step S144 and HD DB91 judges it as an error in step S144. Session establishment processing is ended and object creation processing of drawing 28 is interrupted.

[0151] In step S122 of drawing 28 , in order to secure the page of the chunk which records the object of the object mold number t, from the size record section 167 of the entry t of the object mold record section 163, HD DB91 reads the size of the object of the object mold number t, and computes the pagination of the chunk equivalent to the size. Computed pagination is set to g.

[0152] In step S123, HD DB91 secures the vacant entry of two or more entries which constitute the session management information 181. The processing which secures a vacant entry is explained with reference to the flow chart of drawing 30 .

[0153] In step S151, HD DB91 initializes Variable M to 1. In step S152, HD DB91 judges whether it is several S or less [of the entry from which Variable M constitutes the session management information 181]. When judged with Variable M being several S or less [of an entry], processing progresses to step S153. In step S153, HD DB91 reads the value of the object identifier storing field 183 of the entry M which constitutes the session management information 181. In step S154, HDDB91 judges whether the value of the object identifier storing field 183 of the read entry M is 0. Since it can judge that Entry M is a vacant entry when judged with the value of the object identifier storing field 183 of Entry M being 0, Entry M is secured and it returns to drawing 28 .

[0154] In step S154, when judged with the value of the object identifier storing field 183 of Entry M not being 0, processing progresses to step S155. In step S155, as for HD DB91, only 1 increments Variable M. As for processing, return and subsequent processings are repeated by step S152. Then, in step S154, in order to make a vacant entry since a vacant entry does not exist in the present condition when it is judged with Variable M not being several S or less [of an entry] in step S152, without being

judged with the value of the object identifier storing field 183 of Entry M being 0, processing progresses to step S156.

[0155] In step S156, HD DB91 judges whether the entry all whose values of the read/write session number storing section 184 and the read-only session number storing section 185 thru/or the value of 188 are 0 among the entries which constitute the session management information 181 exists. When judged with such an entry existing, processing progresses to step S157. In step S157, HD DB91 extracts the entry (namely, entry of the oldest access time of day) with the smallest value of the access time-of-day storing field 192 among the entries all whose values of the read/write session number storing section 184 and the read-only session number storing section 185 thru/or the value of 188 are 0.

[0156] In step S158, HD DB91 clears the value of the object identifier storing field 182 of the extracted entry thru/or the access time-of-day storing field 192 to 0, and secures the entry as vacant entry M. Processing returns to drawing 28 .

[0157] In addition, in step S156, since a vacant entry cannot be secured when all the values of the read/write session number storing section 184 and the read-only session number storing section 185 thru/or the value of 188 are judged as the entry which is 0 not existing among the entries which constitute the session management information 181, it progresses to step S159. In step S159, HD DB91 judges it as an error. Vacant entry secured processing is ended and object creation processing of drawing 28 is interrupted.

[0158] In return and step S124, HD DB91 searches the bit string on which 0 [g bits / of the bit string of the field information record section 164] is recorded continuously to drawing 28 . Let the searched location of the head of a bit string where 0 [g-bit] is recorded continuously be q train of p lines. In step S125, HD DB91 stores the object identifier OID (q, p, t) which consists of the chunk number q, page number p, and an object mold number t in the object identifier storing field 183 of the secured entry M, as shown in drawing 27 . Moreover, HD DB91 stores the session number Z in the read/write session number storing field 184 of the entry M of the session management information 181, and records further "CREATE" which shows creation to the object condition storing field 189.

[0159] In step S126, HD DB91 secures the write cache field d equal to pagination g which is the size of an object to a buffer 56. In step S127, HD DB91 stores the address of the write cache field d in the buffer 56 secured in the write cache address storing field 191 of the entry M of the session management information 181.

[0160] In step S128, although HD DB91 starts record of the object X of the object basic the 1 mold shown in the write cache field d secured to the buffer 56 at drawing 26 (A), it records the object identifier OID (q, p, t) on the object identifier record section 201 of the write cache field d as the start. In step S129, HD DB91 records the data (for example, name of the object to create etc.) of the arbitration of the object to

create on the arbitration data storage area 202 of the write cache field d.

[0161] HD DB91 waits for the input of the signal I corresponding to actuation of a user in step S130. In step S131, HD DB91 judges whether Signal I is commit, i.e., the thing which decides session creation. When judged with Signal I being commit, processing progresses to step S132 and the light session Z is decided. When judged with Signal I not being commit on the contrary, processing progresses to step S133 and the light session Z is canceled.

[0162] The processing which decides the light session of step S132 is explained with reference to the flow chart of drawing 31 . In addition, it is deciding reflecting record of the object record section 122 to the creation of an object after the session concerned was established as deciding a session, updating, migration, etc.

[0163] In step S171, HD DB91 initializes Variable M to 1. In step S172, HD DB91 judges whether it is several S or less [of the entry from which Variable M constitutes the session management information 181]. When judged with Variable M being several S or less [of an entry], processing progresses to step S173. In step S173, it judges whether HD DB91 reads the value of the read/write session number storing field 184 of the entry M which constitutes the session management information 181, and is in agreement with the session number Z. When judged with the value of the read/write session number storing field 184 of Entry M and the session number Z not being in agreement, in order to search the entry the value of the read/write session number storing field 184 of Entry M and whose session number Z correspond, processing progresses to step S174.

[0164] In step S174, as for HD DB91, only 1 increments Variable M. As for processing, return and subsequent processings are repeated by step S172. In step S173, when judged with the value of the read/write session number storing field 184 of Entry M and the session number Z being in agreement, processing progresses to step S175. That is, only the entry by which the session number Z is stored in the read/write session number storing field 184 is extracted, and processing after step S175 is performed.

[0165] In step S175, HD DB91 reads an object identifier from the object identifier storing field 183 of Entry M where the session number Z is stored in the read/write session number storing field 184. In step S176, HD DB91 reads the information J which shows an object condition from the object condition storing field 189 of Entry M where the session number Z is stored in the read/write session number storing field 184. In step S176, HD DB91 judges any of "CREATE", "UPTATE", or "REMOVE" the information J which shows an object condition is.

[0166] In step S177, when judged with the information J which shows an object condition being "CREATE", processing progresses to step S178. In step S178, HD DB91 records the object currently recorded on the write cache field d secured to the buffer 56 after the page q of the chunk p of the object record section 122. In step

S179, HD DB91 records 1 on g bits after q train of p lines of the field information record section 164.

[0167] In step S180, HD DB91 copies the value of the write cache address storing field 191 of Entry M to the lead cache address storing field 190. If values other than zero were stored in the lead cache address storing field 190 at this time, the lead cache field in which the buffer 56 which that value shows is formed will be released.

[0168] In step S181, HD DB91 stores 0 in the read/write session number storing field 184 of Entry M, and the write cache address storing field 191. In step S182, HD DB91 updates the value of the access time-of-day storing field 192 of Entry M at current time of day.

[0169] In step S177, when judged with the information J which shows an object condition being "UPDATE", processing progresses to step S183. In step S183, HD DB91 records the object currently recorded on the write cache field d secured to the buffer 56 after the page q of the chunk p of the object record section 122. Processing progresses to step S180.

[0170] In step S177, when judged with the information J which shows an object condition being "REMOVE", processing progresses to step S184. In step S184, HD DB91 records 0 on g bits after q train of p lines of the field information record section 164. In step S185, HD DB91 releases the write cache and lead cache which Entry M has secured to the buffer 56. In step S186, HD DB91 stores 0 in the object identifier storing field 183 of Entry M thru/or the access time-of-day storing field 192. Processing progresses to step S174.

[0171] Then, in step S172, subsequent processings are repeated until it is judged with Variable M not being several S or less [of an entry]. When judged with Variable M not being several S or less [of an entry], the processing which decides a light session is completed.

[0172] With reference to the flow chart of drawing 32 , processing of step S133 of drawing 28 , i.e., the processing which cancels a light session, is explained. In step S191, HD DB91 initializes Variable M to 1. In step S192, HD DB91 judges whether it is several S or less [of the entry from which Variable M constitutes the session management information 181]. When judged with Variable M being several S or less [of an entry], processing progresses to step S193.

[0173] In step S193, it judges whether HD DB91 reads the value of the read/write session number storing field 184 of the entry M which constitutes the session management information 181, and is in agreement with the session number Z. When judged with the value of the read/write session number storing field 184 of Entry M and the session number Z not being in agreement, in order to search the entry the value of the read/write session number storing field 184 of Entry M and whose session number Z correspond, processing progresses to step S194. In step S194, as for HD DB91, only 1 increments Variable M. As for processing, return and subsequent

processings are repeated by step S192.

[0174] In step S193, when judged with the value of the read/write session number storing field 184 of Entry M and the session number Z being in agreement, processing progresses to step S195. That is, only the entry by which the session number Z is stored in the read/write session number storing field 184 is extracted, and processing after step S195 is performed.

[0175] In step S195, HD DB91 releases the write cache field which Entry M has secured to the buffer 56. In step S196, HD DB91 judges whether the object condition stored in the object condition storing field 189 of Entry M is "CREATE", and when it judges with there being no ** whose object condition is "CREATE", it progresses to step S197.

[0176] In step S197, HD DB91 stores 0 in the read/write session number storing field 184 of Entry M, and the write cache address storing field 191. In step S198, HD DB91 updates the value of the access time-of-day storing field 192 of Entry M at current time of day. Processing progresses to step S194.

[0177] In addition, in step S196, when judged with the object condition stored in the object condition storing field 189 of Entry M being "CREATE", processing progresses to step S199. In step S199, HD DB91 stores 0 in the object identifier storing field 183 except read/write session number storing field [of Entry M] 184, and write cache address storing field 191, the read-only session number storing field 185 or 188, the object condition storing field 189, the lead cache address storing field 190, and the access time-of-day storing field 192. Processing progresses to step S194.

[0178] Then, in step S192, subsequent processings are repeated until it is judged with Variable M not being several S or less [of an entry]. When judged with Variable M not being several S or less [of an entry], the processing which cancels a light session is completed.

[0179] Next, retrieval processing of an object is explained with reference to the flow chart of drawing 33 by making into an example the case where the object (it is hereafter described as Object X) which is object identifier OID=X is searched. In addition, the session shall already be established.

[0180] In step S201, HD DB91 acquires the entry M corresponding to Object X. The processing which acquires the entry corresponding to Object X is explained with reference to the flow chart of drawing 34 .

[0181] In step S211, HD DB91 initializes Variable M to 1. In step S212, HD DB91 judges whether it is several S or less [of the entry from which Variable M constitutes the session management information 181]. When judged with Variable M being several S or less [of an entry], processing progresses to step S213.

[0182] In step S213, it judges whether HD DB91 reads the value of the object identifier storing field 183 of the entry M which constitutes the session management information 181, and is in agreement with object identifier OID=X of Object X. When

judged with the value of the object identifier storing field 183 of Entry M and object identifier OID=X of Object X not being in agreement, in order to search the entry the value of the object identifier storing field 183 and whose object identifier OID=X of Object X correspond, processing progresses to step S214.

[0183] In step S214, as for HD DB91, only 1 increments Variable M. As for processing, return and subsequent processings are repeated by step S212. In step S213, since the entry M corresponding to Object X was acquired when judged with the value of the object identifier storing field 183 of Entry M and object identifier OID=X of Object X being in agreement, this processing is ended and processing returns to drawing 33 .

[0184] In addition, in step S213, the case where it is judged with the value of the object identifier storing field 183 of Entry M and object identifier OID=X of Object X not being in agreement continues, and in step S212, when judged with Variable M not being severalS or less of an entry, processing progresses to step S215. In step S215, HD DB91 is an error, i.e., judges that the entry M corresponding to Object X was unacquirable, and ends this processing. Processing returns to drawing 33 .

[0185] When the entry M corresponding to Object X is able to be acquired by processing of return and step S201 to drawing 33 , processing progresses to step S202. In step S202, since HD DB91 acquired the entry M corresponding to Object X, it judges that Object X exists in a buffer 56, and ends processing.

[0186] On the contrary, when the entry M corresponding to Object X is unacquirable by processing of step S201, processing is progress to step S203. In step S203, HD DB91 decomposes object identifier OID=X of Object X, and acquires the chunk number of the object record section 122 where the object is recorded, the page number, and the mold number t of Object X.

[0187] In step S204, HD DB91 computes pagination g required in order to read the value of the size record section 167 of the entry corresponding to the mold number t and to record Object X from the object mold record section 163 based on the value.

[0188] In step S205, HD DB91 judges whether g bits after a q line p train are 1 with reference to the field information storage field 164. When judged with g bits after the q line p train of the field information storage field 164 being 1, processing progresses to step S206. In step S206, HD DB91 sets the lead cache field c equivalent to pagination g as a buffer 56. In step S207, HD DB91 copies the data currently recorded on pagination g after the page p of the chunk q of the object record section 122 to the lead cache field c of a buffer 56.

[0189] In step S208, HD DB91 judges whether the object identifier currently recorded on the part equivalent to the object identifier record section 201 of the data copied to the lead cache field c and the object identifier X are in agreement. Since the data by which the cache is carried out to the lead cache field c are Object X when judged with it being in agreement, processing progresses to step S202.

[0190] In step S208, when judged with the object identifier currently recorded on the

part equivalent to the object identifier record section 201 of the data copied to the lead cache field c and the object identifier X not being in agreement, processing progresses to step S209. In step S209, HD DB91 concludes that Object X does not exist in the object record section 122, either, and ends processing.

[0191] Next, an update process of Object X is explained with reference to the flow chart of drawing 35 . Here, an update process of Object X is processing which rewrites the arbitration data of Object X.

[0192] In step S221, HD DB91 establishes the light session Z like processing of step S121 mentioned above with reference to drawing 29 . In step S222, HD DB91 acquires the entry M to Object X like processing of step S201 mentioned above with reference to drawing 34 .

[0193] When the entry M corresponding to Object X is able to be acquired by processing of step S222, it judges that the cache of the object X is carried out to the lead cache field c set as the buffer 56, and processing progresses to step S223. In step S223, HD DB91 judges whether the value of the read/write session number storing field 184 of Entry M is 0. When judged with the value of the read/write session number storing field 184 of Entry M being 0, processing progresses to step S224.

[0194] In step S224, HD DB91 stores the session number Z of the light session established at step S221 to the read/write session number storing field 184 of Entry M. In step S225, HD DB91 decomposes object identifier OID=X of Object X, and acquires the chunk number of the object record section 122 where the object is recorded, the page number, and the mold number t of Object X.

[0195] In step S226, HD DB91 computes pagination g required in order to read the value of the size record section 167 of the entry corresponding to the mold number t and to record Object X from the object mold record section 163 based on the value. In step S227, HD DB91 sets the write cache field d equivalent to pagination g as a buffer 56. In step S228, HD DB91 stores the address of the write cache field d in the write cache address storing field 191 of Entry M.

[0196] In step S229, HD DB91 copies the data of the lead cache field c of a buffer 56 to the write cache field d. In step S230, HD DB91 records the arbitration data which Object X updates on the arbitration data storage area 202 of the object X to which it was copied by the write cache field d. In step S231, HD DB91 stores information "UPDATE" which shows updating to the object condition storing field 189 of Entry M.

[0197] HD DB91 waits for the input of the signal I corresponding to actuation of a user in step S232. In step S233, HD DB91 judges whether Signal I is commit, i.e., the thing which decides the renewal of a session. When judged with Signal I being commit, processing progresses to step S234. In step S234, HD DB91 decides the light session Z like processing of step S132 mentioned above with reference to drawing 31 . When judged with Signal I not being commit on the contrary, processing progresses to step S235. In step S235, HD DB91 cancels the light session Z like processing of step S133

mentioned above with reference to drawing 32 .

[0198] In addition, in step S223, since it can judge that Object X is under updating by other sessions other than Session Z when judged with the value of the read/write session number storing field 184 of Entry M not being 0, processing progresses to step S235.

[0199] Moreover, when the entry M corresponding to Object X is unacquirable in processing of step S222, processing is progress to step S236. In step S236, HD DB91 secures vacant entry M like processing of step S123 mentioned above with reference to drawing 30 .

[0200] In step S237, HD DB91 decomposes object identifier OID=X of Object X, and acquires the chunk number of the object record section 122 where the object is recorded, the page number, and the mold number t of Object X. In step S238, HD DB91 computes pagination g required in order to read the value of the size record section 167 of the entry corresponding to the mold number t and to record Object X from the object mold record section 163 based on the value. In step S239, HD DB91 sets the lead cache field c and the write cache field d equivalent to pagination g as a buffer 56.

[0201] In step S240, HD DB91 stores the address of the lead cache field c in the lead cache address storing field 190 of Entry M, stores the address of the write cache field d in the write cache address storing field 191 of Entry M, and stores object identifier IOD=X of Object X in the object identifier storing field 183 of Entry M.

[0202] In step S241, HD DB91 copies the data of the object X currently recorded by pagination [after the page p of the chunk q of the object record section 122] g to the lead cache field c of a buffer 56. Processing progresses to step S229.

[0203] As explained above, in an update process of File X, the data of File X are copied to the write cache field d from the lead cache field c, the data of the file X by which the cache is carried out to the write cache field d are rewritten, and the rewritten result is recorded on the object record section 122 by the processing which decides a session.

[0204] Next, the processing which creates the object of the contents data recorded on the file record section 121 and the truck corresponding to 1 to 1, i.e., the stream object of object mold number t', is explained with reference to the flow chart of drawing 36 . In addition, as shown in drawing 27 , the prototype number (in the case of now basic object the 2 mold) and the entry number are contained in object mold number t'.

[0205] In step S251, HD DB91 establishes a light session like processing of step S121 mentioned above with reference to the flow chart of drawing 29 . a step -- S -- 252 -- setting -- HD DB -- 91 -- an object -- a mold -- a number -- t -- ' -- a stream -- an object -- recording -- a chunk -- a page -- securing -- a sake -- an object -- a mold -- a record section -- 163 -- an entry -- t -- ' -- size -- a record section --

167 -- from -- an object -- a mold -- a number -- t -- ' -- an object -- size -- reading -- the -- size -- corresponding -- a chunk -- pagination -- computing . Computed pagination is set to g.

[0206] In step S253, HD DB91 secures vacant entry M of two or more entries which constitute the session management information 181 like processing of step S123 mentioned above with reference to the flow chart of drawing 30 . In step S254, HD DB91 searches the bit string on which 0 [g bits / of the bit string of the field information record section 164] is recorded continuously. Let the searched location of the head of a bit string where 0 [g-bit] is recorded continuously be q train of p lines. In step S255, HD DB91 stores the object identifier OID (q, p, t') which consists of chunk number q, page number p, and object mold number t' in the object identifier storing field 183 of the secured entry M, as shown in drawing 27 . Moreover, HD DB91 stores the session number Z in the read/write session number storing field 184 of the entry M of the session management information 181, and records further "CREATE" which shows creation to the object condition storing field 189.

[0207] In step S256, HD DB91 secures the write cache field d equal to pagination g which is the size of a stream object to a buffer 56. In step S257, HD DB91 stores the address of the write cache field d in the buffer 56 secured in the write cache address storing field 191 of the entry M of the session management information 181.

[0208] In step S258, although HD DB91 starts record of the stream object X of the object basic the 2 mold shown in the write cache field d secured to the buffer 56 at drawing 26 (B), it records the object identifier OID (q, p, t') on the object identifier record section 201 of the write cache field d as the start. In step S259, HD DB91 acquires the file identification child F of the contents data created by HD FS92 corresponding to a stream object (the same value as the cluster number of the head of a series of clusters where this contents data was recorded). In step S260, HD DB91 records the file identification child F on the file identification child record section 103 of the write cache field d.

[0209] In step S261, HD DB91 starts acquisition of the arbitration data (for example, name of the stream object to create etc.) of the stream object to create. In step S262, HD DB91 stands by until acquisition of arbitration data is completed. In addition, between step S261 and processing of S262, the file of the contents data of the file identification child F corresponding to the stream object concerned is created by HD FS92, and it is recorded on the file record section 121.

[0210] In step S263, HD DB91 records the arbitration data acquired to the arbitration data storage area 202 of the write cache field d.

[0211] HD DB91 waits for the input of the signal I corresponding to actuation of a user in step S264. In step S265, HD DB91 judges whether Signal I is commit, i.e., the thing which decides session creation. When judged with Signal I being commit, processing progresses to step S266. In step S266, HD DB91 decides the light session Z like

processing to step S132 mentioned above with reference to drawing 31 .

[0212] When it is judged with Signal I not being commit in step S265 on the contrary, processing progresses to step S267. In step S267, HD DB91 cancels the light session Z like processing to step S133 mentioned above with reference to drawing 32 . In step S268, HD DB91 requests deletion of File F from HD FS92. As mentioned above, explanation of creation processing of a stream object is ended.

[0213] Next, the processing which searches the stream object (it is hereafter described as the stream object X) which is object identifier OID=X is explained with reference to the flow chart of drawing 37 . In addition, the session shall already be established.

[0214] In step S271, HD DB91 performs retrieval processing of Object X mentioned above with reference to drawing 33 , and same processing. In step S272, the object mold number contained in object identifier OID=X of the object X searched with processing of step S271 is acquired. The acquired object mold number is set to t. Furthermore, HD DB91 acquires the object prototype number contained in the object mold number t.

[0215] In step S273, HD DB91 judges whether the basic object mold number of the searched object X is basic object the 2 mold. Since the searched object X is a stream object when judged with the basic object mold number of the searched object X being basic object the 2 mold, processing progresses to step S274. In step S274, HD DB91 reads a file identification child in the file identification child record section 203 of the searched stream object X, and supplies him to HD FS92.

[0216] In addition, in step S271, when the object of object identifier OID=X is not able to be searched, processing progresses to step S275. Moreover, in step S273, also when judged with the basic object mold number of the searched object X not being basic object the 2 mold, processing progresses to step S275. In step S275, HD DB91 judges that Error X, i.e., a stream object, does not exist, and ends stream object retrieval processing.

[0217] Next, drawing 38 shows the directory structure of the object recorded on the object record section 122. In the object record section 122, the folder list object 212, the folder object 213, the album object 214, and the truck object 215 are making the layered structure under the root 211.

[0218] HD DB91 can generate two or more folder objects 213 under the folder list object 212. Under the folder object 213, two or more album objects 214 are generable. Under the album object 214, two or more truck objects 215 are generable. The truck object 215 supports the contents data for one music.

[0219] In case the folder object 213, the album object 214, and the truck object 215 choose the musical piece to reproduce, they are an object which a user is shown. HD DB91 can generate the objects (CC (Content Control) object 216 etc.) of other information which is not the objects which a user is shown under the root 211, the

folder list object 212, or the folder object 213.

[0220] Furthermore, HD DB91 forbids other objects other than folder object 213 to the bottom of the same folder list object 212, when the folder object 213 is generated under the folder list object 212. Moreover, when the album object 214 is generated under the folder object 213, it prohibits the bottom of the same folder object 213 from generating objects other than album object 214. Moreover, it prohibits the bottom of the album object 214 from generating objects other than truck object 215.

[0221] Since each object is recorded according to the regulation mentioned above, the folder group 217, the album group 218, and the truck group 219 are built in the object record section 122.

[0222] Next, the data format of each object is explained.

[0223] Drawing 39 shows the data format of the folder list object 212. Since the folder list object 212 belongs to the basic object the 1 mold shown in drawing 26 (A), it consists of an object identifier record section 201 and an arbitration data storage area 202. 4 bytes of object identifier OID is recorded on the object identifier record section 201 of the folder list object 212.

[0224] several [of the folder object 213 currently created under the maximum MAX (4 bytes) of the folder object 213 which can be created under the folder list object 212 concerned in the arbitration data storage area 202 of the folder list object 212, and the folder list object 212 concerned] -- 4x100 bytes of Folder which shows the list of ID of N (4 bytes) and the folder object 213 currently created under the folder list object 212 concerned is recorded. 612 bytes of reserve is prepared in the arbitration data storage area 202 of the folder list object 212.

[0225] Drawing 40 shows the data format of the folder object 213. Since the folder object 213 belongs to the basic object the 1 mold shown in drawing 26 (A), it consists of an object identifier record section 201 and an arbitration data storage area 202. 4 bytes of object identifier OID is recorded on the object identifier record section 201 of the folder object 213.

[0226] several [of the album object 214 currently created under the maximum MAX (4 bytes) of the album object 214 which can be created under the folder object 213 concerned in the arbitration data storage area 202 of the folder object 213, and the folder object 213 concerned] -- N (4 bytes), 4x200 bytes of Album which shows the list of ID of the album object 214 currently created under the folder object 213 concerned, and 36 bytes of Title which shows the folder name of the folder object 213 concerned are recorded. 176 bytes of reserve is prepared in the arbitration data storage area 202 of the folder object 213.

[0227] Drawing 41 shows the data format of the album object 214. Since the album object 214 belongs to the basic object the 1 mold shown in drawing 26 (A), it consists of an object identifier record section 201 and an arbitration data storage area 202. 4 bytes of object identifier OID is recorded on the object identifier record section 201 of

the album object 214.

[0228] In the arbitration data storage area 202 of the album object 214 The maximum MAX (4 bytes) of the truck object 215 which can be created under the album object 214 concerned, Several Ns of the truck object 215 currently created under the album object 214 concerned (4 bytes), 4x400 bytes of Track which shows the list of ID of the truck object 215 currently created under the album object 214 concerned, 516 bytes of Title which shows the title name of the album object 214 concerned, 260 bytes of Artist which shows the artist name of the album object 214 concerned, 32 bytes of media key which shows 8 bytes of Creation Date which shows the generation time of the album object 214 concerned, and the media key of the music CD 3 which it is under the album object 214 concerned is recorded. 1660 bytes of reserve is prepared in the arbitration data storage area 202 of the album object 214.

[0229] Drawing 42 shows the data format of the truck object 215. Since the truck object 215 belongs to the basic object the 2 mold shown in drawing 26 (B), it consists of an object identifier record section 201, an arbitration data storage area 202, and a file identification child record section 203. 4 bytes of object identifier OID is recorded on the object identifier record section 201 of the truck object 215. 4 bytes of SOID which shows the file identification child of the contents data (recorded on the file record section 121) corresponding to 1 to 1 is recorded on the file identification child record section 203 of the truck object 215.

[0230] In the arbitration data storage area 202 of the truck object 215 516 bytes of Title which shows the music name of the truck object 215 concerned, 260 bytes of Artist which shows the artist name of the truck object 215 concerned, 8 bytes of Time which shows the playback time amount of the album object 214 concerned, 8 bytes of Last Access Date which shows the time accessed at the end to the truck object 215 concerned, And 4 bytes of play counter which shows the count of playback of the truck object 215 concerned (PC), 8 bytes of CreationDate which shows the work time of the truck object 215 concerned, and 12544 bytes of AC which shows the music attribute and playback control information (information for protection of copyrights) of contents data corresponding to the truck object 215 concerned are recorded. 980 bytes of reserve is prepared in the arbitration data storage area 202 of the truck object 215.

[0231] Drawing 43 shows the detail of 1255 bytes of AC recorded on the arbitration data storage area 202 of the truck object 215. 8 bytes of Ckey which shows KONTENTSUKI - to AC, 1 byte of Codec which shows a codec discernment value, 1 byte of Codec Attr which shows a codec attribute, 1 byte of LT which shows playback limit information, 1 byte of VLD which shows the flag for a justification check, 1 byte of LCMLOGNUM which shows the number of a check-out place, 16 bytes of CDI which shows codec dependency information, 20 bytes of CID which shows a contents serial number, 8 bytes of PBE which shows 8 bytes of PBS and playback authorization

termination time which show playback authorization initiation time, 1 byte of XCC which shows Escape CC, 1 byte of CT which shows the remainder of the count of playback, 48x256 bytes of LCMLOG which shows the information containing 1 byte of CC which shows contents control information, 1 byte of CN which shows the count of the check-out remainder, 40 bytes of solvent refined coal which shows the source information, and Device ID and the flag of a check-out place is recorded.

[0232] 1 byte of especially CC that shows contents control information shows the 1st bit of the existence of copyright from the MSB (Most Significant Bit) side (0: **, nothing [1:]). The 2nd bit [from the MSB side which shows a generation (0: except original and 1:original) / 3 or 4th] bit from the MSB side was not used.

[0233] The information which 5 from the MSB side of CC thru/or the 7th bit show is as follows. That is, when 010 is recorded on 5 from the MSB side of CC thru/or the 7th bit, check-out authorization (edit is permitted) is shown. When 011 is recorded on 5 from the MSB side of CC thru/or the 7th bit, MUBU authorization (the edit by PD5 is forbidden) is shown. When 100 is recorded on 5 from the MSB side of CC thru/or the 7th bit, import authorization (the edit by PD5 is permitted) is shown. When 110 is recorded on 5 from the MSB side of CC thru/or the 7th bit, import authorization (the edit by PD5 is forbidden) is shown.

[0234] Drawing 44 shows the data format of the truck object 215 and the contents data which correspond by 1 to 1. Contents data consist of 16 K bytes each of AT3SU-1 thru/or AT3 SU-N which shows 16 K bytes of PRT which shows 16 K bytes of AT3H and ATRAC3 parts in which ATRAC3 header is shown, and a sound unit train.

[0235] Drawing 45 shows the data format of the CC object 216. The CC object 216 belongs to the basic object the 2 mold shown in drawing 26 (B). Therefore, the CC object 216 consists of an object identifier record section 201 and an arbitration data storage area 202. 4 bytes of object identifier OID is recorded on the object identifier record section 201 of the CC object 216.

[0236] 16 bytes of reserve is prepared in the arbitration data storage area 202 of the CC object 216. 4 bytes of SOID which shows the file identification child of corresponding CC data (recorded on the file record section 121) is recorded on the file identification child record section 203 of the CC object 216.

[0237] Drawing 46 shows the format of CC data recorded on the file record section 121. 10 K bytes of Cat Folder, 200 K bytes of Cat Album, and 600 K bytes of Cat Track are contained in CC data. The information which shows the object identifier OID of the folder object 213 corresponding to the folder as which a user chooses Cat Folder is recorded. The information which shows the object identifier OID of the album object 214 corresponding to the album which a user chooses is recorded on Cat Album. The information which shows the object identifier OID of the truck object 215 corresponding to the truck which a user chooses is recorded on Cat Track.

[0238] If the truck which follows, for example, a user reproduces at the time of

playback is chosen, based on Cat Track of CC data, the file identification child who the object identifier OID of the truck object 215 corresponding to the selected truck becomes clear, and corresponds from the truck object 215 which became clear will be acquired, and contents data will be read and reproduced.

[0239] Next, the data flow at the time of each function of the audio server 1 being performed and correspondence with firmware are explained with reference to drawing 47 thru/or drawing 56 .

[0240] Drawing 47 shows the data flow at the time of CD ripping being performed. In CD ripping which records music CD 3 at high speed, with CD-ROM drive 57, the digital audio data of music CD 3 are read by control of CD MW88 by 8X CAV, and are buffered by the buffer 56 by it. Moreover, by control of HD MW82, the digital audio data buffered by the buffer 56 are inputted into the WM screen 60-2, and a water mark is detected. Next, after the coded data which the digital audio data buffered by the buffer 56 were encoded by the encoder 59 with ATRAC3 method by an average of 5X, were enciphered by control of HDMW82 with it, and was obtained by it is buffered with a buffer 56, it is transmitted and recorded on HDD58. In addition, although illustration was omitted, in the midst of CD ripping, the voice corresponding to the digital audio data currently recorded is outputted from a loudspeaker 2.

[0241] Drawing 48 shows the data flow at the time of CD recording being performed. In CD recording recorded while playing music CD 3, with CD-ROM drive 57, the digital audio data of music CD 3 are read by control of CD MW88 by 8X CAV, and are buffered by the buffer 56 by it. Next, after the coded data which the digital audio data buffered by the buffer 56 were encoded by the encoder 59 with ATRAC3 method by an average of 5X, were enciphered by control of HDMW82 with it, and was obtained by it is buffered with a buffer 56, it is transmitted and recorded on HDD58. Moreover, the audio data buffered by the buffer 56 are supplied to the WM screen 60-2 by control of HD MW82, and a water mark is detected by it.

[0242] On the other hand, after the digital audio data buffered for monitor voice are temporarily recorded on the ring buffer 241 (drawing 61) formed in HDD58 by control of HD MW82, they are read by it and inputted into audio I/F 60-3 by it. Next, digital audio data are transmitted to D/A62, and are analog-ized by control of AIO MW94, and the voice which corresponds from a loudspeaker 2 is outputted.

[0243] In addition, about CD ripping and the detail of CD recording, it mentions later with reference to drawing 57 thru/or drawing 70 .

[0244] Drawing 49 shows the data flow at the time of HD recording to a digital input being performed. In HD recording which encodes a digital input and is recorded on HDD58, the digital audio data inputted from the AUX Inn terminal 31 are supplied to an encoder 59 by control of AIO MW94 through the signal-processing section 60. Next, after the coded data which digital audio data were encoded and enciphered by control of HD MW82 according to ATRAC3 method with the encoder 59, and was obtained by

it is transmitted to a buffer 56, it is transmitted and recorded on HDD58. Moreover, a water mark is detected by control of HD MW82 on the WM screen 60-2 of the signal-processing section 60. Furthermore, by audio I/F 60-3 of the signal-processing section 60, digital audio data are transmitted to D/A62, are analog-ized by control of AIO MW94, and are outputted from a loudspeaker 2.

[0245] Drawing 50 shows the data flow at the time of HD recording to an analog input being performed. In HD recording which encodes an analog input and is recorded on HDD58, the analog audio data inputted from the AUX Inn terminal 31 are digitized by A/D62, and are supplied to an encoder 59 by control of AIO MW94. Next, it is encoded by the encoder 59 with ATRAC3 method, and is enciphered by it, and digital audio data are transmitted and recorded on HDD58 by control of HD MW82, after the obtained coded data is transmitted to a buffer 56. Moreover, a water mark is detected by control of HD MW82 from the digitized output of A/D62 with the WM screen 60-2. Furthermore, the analog audio data inputted from the AUX Inn terminal 31 are outputted by control of AIO MW94 from a loudspeaker 2.

[0246] Drawing 51 shows the data flow at the time of HD play being performed. At HD play which reproduces the coded data of HDD58, by control of HD MW82, after the coded data read from HDD58 is buffered by the buffer 56, it is decoded and decoded by the decoder 59. After the obtained digital audio data are buffered by the buffer 56, they are transmitted to audio I/F 60-3. Next, by audio I/F 60-3, digital audio data are transmitted to D/A62, are analog-ized by control of AIO MW94, and are outputted from a loudspeaker 2.

[0247] Drawing 52 shows the data flow at the time of CD play being performed. At CD play which plays music CD 3, by control of CD MW88, after the digital audio data of music CD 3 are read by CD-ROM drive 57 and buffered by the buffer 56, they are transmitted to audio I/F 60-3. Next, by audio I/F 60-3, digital audio data are transmitted to D/A62, are analog-ized by control of AIO MW94, and are outputted from a loudspeaker 2.

[0248] Drawing 53 shows the data flow at the time of MS play being performed. At MS play which reproduces the coded data of MS4, as shown in this drawing (A), the coded data of MS4 is supplied to MGMS I/F 60-1 by control of MS MW89, and MGMS I/F 60-1 decodes after mutual recognition, and it is decoded by the decoder which the signal-processing section 60 builds in. Next, by audio I/F 60-3, the digital audio data obtained as a result of decoding are transmitted to D/A62, are analog-ized by control of AIO MW94, and are outputted from a loudspeaker 2.

[0249] Or as shown in this drawing (B), coded data is read from MS4 by control of MS MW89, MGMS I/F 60-1 is supplied, and MGMS I/F 60-1 decodes after mutual recognition by it. The compounded coded data is buffered by the buffer 56, it is decoded by the decoder 59, and the obtained digital audio data are outputted to D/A62 through a buffer 56. Next, the audio data analog-ized by D/A62 are outputted

by control of AIO MW94 from a loudspeaker 2.

[0250] Drawing 54 shows the data flow at the time of MS check-out / MUBU out being performed. With MS check-out which copies the coded data of HDD58 to MS4, and the MUBU out which moves the coded data of HDD58 to MS4, the coded data read from HDD58 is buffered by the buffer 56 by control of HD MW82. Next, the coded data buffered is transmitted to MGMS I/F 60-1, and is recorded on MS4 by control of MS MW89. In addition, the back explains check-out and MUBU out in full detail.

[0251] Drawing 55 shows the data flow at the time of MS import / MUBUIN being performed. In MS import / MUBUIN which moves the coded data of MS4 to HDD58, the coded data of MS4 is transmitted to a buffer 56 through MGMS I/F 60-1 by control of MS MW89. Next, the coded data buffered is transmitted and recorded on HDD58 by control of HD MW82. In addition, the back explains import/MUBUIN in full detail.

[0252] Drawing 56 shows the data flow at the time of PD check-out being performed. In PD check-out which copies the coded data of HDD58 to PD5, by control of HD MW82, after being buffered by the buffer 56, the coded data read from HDD58 is decoded by an encoder / decoder 59, and again, it is enciphered for PD5 and it is buffered by the buffer 56. Next, the coded data buffered is recorded on PD5 by control of PD MW90 through the USB host controller 54 and the USB connector 43.

[0253] Next, CD ripping and the detail of CD recording are explained with reference to drawing 57 thru/or drawing 70 . Processing of CD ripping is processing performed when the high speed recording carbon button 24 is pushed by the user. Processing of CD recording is processing performed when the recording carbon button 23 is pushed by the user.

[0254] The difference between CD ripping and CD recording is explained with reference to drawing 57 and drawing 58 . Drawing 57 (A) shows the period of the monitor voice output in CD ripping. Drawing 57 (B) shows the period of processing (processing encoded and recorded) of the sound recording in CD ripping. Drawing 58 (A) shows the period of the monitor voice output in CD recording. Drawing 58 (B) shows the period of processing (processing encoded and recorded) of the sound recording in CD recording.

[0255] Drawing 57 (B) is compared with drawing 58 (B), and the sum total time amount which processing of the sound recording takes by CD ripping and CD recording is the same so that clearly. That is, processing which encodes the audio data (PCM data) of music CD 3 with ATRAC3 method, and is recorded on HDD58 is performed by an average of 5X to the reproduction speed of audio data.

[0256] For example, when six music of music whose playback time amount is for 10 minutes is recorded and it records the music CD 3 whose total playback time amount is for 60 minutes by CD ripping or CD recording, for about 2 minutes is required per music, and sequential sound recording is carried out.

[0257] The difference between CD ripping and CD recording is the period of a monitor voice output.

[0258] In the case of CD ripping, monitor voice is outputted only for the period when sound recording processing of audio data in which a monitor voice output corresponds is performed. In the example of music CD 3 mentioned above, the voice for about 2 minutes after the head of the 1st music is outputted with the usual reproduction speed, next the voice for about 2 minutes after the head of the 2nd music is outputted at the rate of usual, and the voice for about 2 minutes after the head of each music is henceforth outputted at the rate of usual. Therefore, a monitor voice output is also ended by termination and coincidence of sound recording processing.

[0259] In CD recording, monitor voice is outputted regardless of the progress situation of sound recording processing of audio data in which a monitor voice output corresponds. In the example of music CD 3 mentioned above, all the voice of the 1st music is outputted with the usual reproduction speed, next all the voice of the 2nd music is outputted at the rate of usual, and all the voice of each music is henceforth outputted at the rate of usual. Therefore, even if sound recording processing is completed, the monitor voice output of corresponding audio data is continued to the last end of the 6th music.

[0260] In addition, CD ripping and CD recording can be suitably changed in the middle of the processing.

[0261] Next, drawing 59 shows the condition of the buffer 56 at the time of CD ripping or CD recording being performed. The PCM data reading buffer 231 for buffering audio data (PCM data) before [which was read from music CD 3] encoding, and the coding data buffer 232 for buffering the coded data encoded and enciphered by the encoder / decoder 59 are formed in a buffer 56.

[0262] Drawing 60 shows the state transition of the PCM data reading buffer 231 formed in a buffer 56 and the coding data buffer 232, and the buffer 251 for PCM data playback built in a list at audio I/F 60-3. The PCM data reading buffer 231, the coding data buffer 232, and the buffer 251 for PCM data playback are in one condition of the conditions during read-out which will change if read-out of the condition which changes after the writing of a condition and data is completed during the writing which will change, respectively if the writing of the early condition which can be written in, and data is started, and which can be read, and data is started. In addition, during read-out, after read-out of data is completed, it returns from a condition to the condition which can be written in.

[0263] Next, in case CD ripping or CD recording is performed, since the PCM data for monitor voice outputs are buffered, drawing 61 shows the structure of the ring buffer 241 prepared in HDD58.

[0264] The read-out pointer 242 in which a read-out starting address is shown, and the write-in pointer 243 in which a write-in starting address is shown are set to the

ring buffer 241 which has a predetermined capacity (it considers as the expedient top, the address 0, or Address max of explanation). The ring buffer 241 is classified into the writable area 245 of from the address which reads from the address which the write-in pointer 243 shows to the forward direction, and a pointer 242 shows until the field 244 to the address which writes in the forward direction from the address which the read-out pointer 242 shows, and a pointer 243 shows which can be read. The capacity of the field 244 which can be read is called a read-out margin. The capacity of a writable area 245 is called a write-in margin.

[0265] Drawing 62 shows the data flow between each buffer in CD ripping and CD recording. The PCM data of music CD 3 are buffered by the PCM data reading buffer 231 which was read by CD-ROM drive 57 and formed in the buffer 56. It is transmitted to an encoder / decoder 59, it encodes, and the PCM data buffered by the PCM data reading buffer 231 are enciphered. The obtained coded data is buffered by the coding data buffer 232 prepared in the buffer 56. The coded data buffered by the coding data buffer 232 is transmitted to HDD58, and is recorded on the file record section 121.

[0266] On the other hand, the PCM data buffered by the PCM data reading buffer 231 are transmitted to HDD58, and are buffered by the ring buffer 241 formed in HDD58. After the PCM data buffered by the ring buffer 241 are transmitted and buffered by the buffer 251 for PCM data playback built in audio I/F 60-3, they are analog-ized by AD/DA62 and are outputted from a loudspeaker 2.

[0267] Next, the sound recording rate setting processing about CD ripping and CD recording is explained with reference to the flow chart of drawing 63 . This sound recording rate setting processing is repeatedly performed, while music CD 3 is chosen as a sound source (i.e., while CD-ROM drive 57 is equipped with music CD 3 and CD is chosen with the function button 12).

[0268] In step S281, input handle middleware 97 starts the monitor of actuation from the user to various kinds of carbon buttons. In step S282, it stands by until input handle middleware 97 has the actuation from the user to various kinds of carbon buttons, and when judged with there having been actuation from the user to various kinds of carbon buttons, it notifies the information to Maine APP76. It judges whether Maine APP76 is actuation to the record carbon button 23. When judged with it being actuation to the record carbon button 23, processing progresses to step S283.

[0269] In step S283, Maine APP76 notifies that the record carbon button 23 was operated to HD APP77. HD APP77 transmits that the record carbon button 23 was operated to CD RIPPING84 of HD MW82. The high speed sound recording flag with which self forms CD RIPPING84 in SDRAM53 etc. is set up off. Processing returns to step S281.

[0270] In step S282, when it is judged with there having been actuation from the user to various kinds of carbon buttons and judges that it is not actuation to the record carbon button 23, processing progresses to step S284. In step S284, it judges whether

Maine APP76 is actuation to the high speed record carbon button 24. When judged with it being actuation to the high speed record carbon button 24, processing progresses to step S285.

[0271] In step S285, Maine APP76 notifies that the high speed record carbon button 24 was operated to HD APP77. HD APP77 transmits that the high speed record carbon button 24 was operated to CD RIPPING84 of HD MW82. CD RIPPING84 sets a high speed sound recording flag as ON. Processing returns to step S281.

[0272] In step S284, when judged with it not being actuation to the high speed record carbon button 24, processing returns to step S281.

[0273] When the high speed record carbon button 24 is operated and a high speed sound recording flag is set to ON by sound recording rate setting processing in which it explained above, CD ripping as shown in drawing 57 is performed. When the record carbon button 23 is operated and a high speed sound recording flag is set to OFF on the contrary, CD recording as shown in drawing 58 is performed. In addition, the change to CD ripping from CD recording can be carried out to the change to CD recording from CD ripping, and reverse to the timing of arbitration corresponding to a user's button grabbing.

[0274] Next, CD sound recording processing is explained to drawing 64 with reference to a flow chart. This CD sound recording processing is processing controlled by CD RIPPING84 contained in HD MW82, and after being equipped with music CD 3, operating a function button 12 and setting a sound source as CD, when the record carbon button 23 or the high speed carbon button 24 is operated, it is started.

[0275] In step S291, a user selects a song in the music recorded out of music CD 3, while being in a sound recording halt condition by having operated the record carbon button 23 or the high speed carbon button 24. Specifically the cursor carbon button 17 is operated, a song is selected from the music currently recorded on music CD 3, the ENTA carbon button 20 is operated, and song selection is decided. By repeating this the actuation of a series of, a song is selected in all the music to record. In addition, when actuation of song selection is not performed especially, it means that all the music currently recorded on music CD 3 had selected the song.

[0276] A user operates playback / pause button 26 in the phase which song selection completed. Processing progresses to step S292.

[0277] In step S292, CD RIPPING84 initializes the ring buffer information which consists of information on the read-out starting address which the read-out pointer 242 set as the ring buffer 241 shows. This ring buffer information initialization processing is explained with reference to the flow chart of drawing 65 . In step S301, CD RIPPING84 sets the read-out starting address which the read-out pointer 242 shows, and the write-in starting address which the write-in pointer 243 shows as the address 0 of the ring buffer 241. Furthermore, the read-out margin of the ring buffer 241 is set as 0, and a write-in margin is set as the maximum max. As mentioned above,

explanation of ring buffer information initialization processing is ended.

[0278] It returns to drawing 64 . In step S293, CD RIPPING84 makes sequential selection of the one music which selected the song at step S291, and performs sound recording processing for one music. The sound recording processing for one music is explained with reference to the flow chart of drawing 66 . CD RIPPING84 makes the PCM data reading buffer 231 in every [predetermined / the amount of data (a part for for example, for 2 seconds)], and the condition which can be written in buffer the PCM data of the music which music CD 3 records by requesting CD MW88 in step S311. When the writing (buffering) of the PCM data of the predetermined amount of data is completed, the condition of the PCM data reading buffer 231 changes in the condition which can be read.

[0279] CD RIPPING84 makes the PCM data of the predetermined amount of data buffered by the PCM data reading buffer 231 encode to an encoder / decoder 59 in step S312 (it is made to encode and encipher). When read-out of the PCM data of the predetermined amount of data of the PCM data reading buffer 231 is completed, the condition of the PCM data reading buffer 231 changes in the condition which can be written in.

[0280] Moreover, CD RIPPING84 starts monitor voice output processing. About monitor voice output processing, it mentions later with reference to drawing 67 .

[0281] step S313 -- setting -- CD RIPPING84 -- encoding -- the coding data buffer 232 in the condition of a buffer 56 which can be written in is made to buffer the coded data of the obtained predetermined amount of data When the writing (buffering) of the coded data of the predetermined amount of data (a part for for example, for 2 seconds) is completed, the condition of the coding data buffer 232 changes in the condition which can be read.

[0282] CD RIPPING84 makes the coded data of the predetermined amount of data buffered by the coding data buffer 232 record on the file record section 121 of HDD58 in step S314. In addition, the processing to which predetermined amount-of-data [every] coded data is made to record on the file record section 121 is equivalent to the file creation processing mentioned above with reference to drawing 14 . Moreover, object creation processing mentioned above with reference to drawing 28 is also performed.

[0283] In step S315, CD RIPPING84 judges whether the coded data for one music was recorded. When judged with the coded data for one music not being recorded, as for processing, return and subsequent processings are repeated by step S311. Then, in step S315, when judged with the coded data for one music having been recorded, the sound recording processing concerned for one music is ended.

[0284] As it explains above, after sound recording processing for one music is performed, processing returns to step S294 of drawing 64 . In step S294, CD RIPPING84 judges whether all the music that selected the song at step S291 was

recorded. When judged with no music which selected the song being recorded, as for processing, sound recording processing for one music to return and the following music is performed to 293.

[0285] Then, in step S294, when judged with all the music that selected the song having been recorded, this CD sound recording processing is terminated.

[0286] Here, the monitor voice output processing started in step S312 is explained with reference to the flow chart of drawing 67 . In step S321, CD RIPPING84 judges whether a high speed sound recording flag is ON. When judged with a high speed sound recording flag being ON, processing progresses to 322.

[0287] In step S322, CD RIPPING84 judges whether the sound recording processing for one music to corresponding PCM data is completed. Since the monitor voice of the PCM data which the sound recording processing for one music is performing is outputted when judged with the sound recording processing for one music to corresponding PCM data not being completed, processing progresses to step S323.

[0288] In step S323, CD RIPPING84 starts write-in processing of the PCM data buffered by the PCM data reading buffer 231 to the link buffer 241. In step S324, CD RIPPING84 starts read-out processing of the PCM data recorded on the link buffer 241, without waiting for termination of processing of step S323.

[0289] The write-in processing to the ring buffer 241 in step S323 is explained with reference to the flow chart of drawing 68 .

[0290] In step S331, CD RIPPING84 judges whether a high speed sound recording flag is ON. When judged with a high speed sound recording flag being ON, processing progresses to 332. In step S332, CD RIPPING84 performs ring buffer information initialization processing mentioned above with reference to drawing 65 .

[0291] In step S333, CD RIPPING84 starts the writing of the PCM data currently recorded on the writable area 245 after the write-in starting address which the write-in pointer 243 of link buffer information shows by the PCM data reading buffer 231. In step S334, only the part of the PCM data written in at step S333 advances the value of the write-in starting address which the write-in pointer 243 contained in link buffer information shows to the forward direction, and CD RIPPING84 updates the value of a write-in margin and a read-out margin for it corresponding to it.

[0292] In addition, in step S331, when judged with a high speed sound recording flag not being ON, processing progresses to 335. In step S335, CD RIPPING84 judges whether the size of the PCM data currently recorded on the PCM data reading buffer 231 is below the write-in margin of the ring buffer 241 by referring to ring buffer information. When it judges that the size of the PCM data currently recorded on the PCM data reading buffer 231 is below the write-in margin of the ring buffer 241, processing progresses to step S333.

[0293] In step S335, in addition, the size of the PCM data currently recorded on the PCM data reading buffer 231 When judged with it not being below the write-in margin

of the ring buffer 241, when a setup of a sound recording rate makes it change into step S331 by the user return and after that, processing [whether in step S331, it is judged with a high speed sound recording flag being ON, and] Or when the write-in margin of the ring buffer 241 increases In step S335, processing of step S331 and step S335 is repeated until it judges that the size of the PCM data currently recorded on the PCM data reading buffer 231 is not below the write-in margin of the ring buffer 241. As mentioned above, explanation of the write-in processing to the ring buffer 241 is ended.

[0294] The read-out processing from the ring buffer 241 in step S324 is explained with reference to the flow chart of drawing 69 . In step S341, CDRIPPING84 stands by until it judges whether the buffer 251 for PCM data playback built in audio I/F 60-3 is in the condition which can be written in and judges with the buffer for PCM data playback being in the condition which can be written in. When judged with the buffer for PCM data playback being in the condition which can be written in, processing progresses to step S342.

[0295] CD RIPPING84 reads the PCM data currently recorded on the field 244 of the ring buffer 241 which can be read according to the read-out starting address which the read-out pointer 242 of the ring buffer 241 shows, and is made to write them in the buffer 251 for PCM data playback in step S342.

[0296] In step S343, only the part of the PCM data read at step S342 advances the value of the read-out starting address which the read-out pointer 242 contained in link buffer information shows to the forward direction, and CD RIPPING84 updates the value of a write-in margin and a read-out margin for it corresponding to it.

[0297] CD RIPPING84 makes the buffer 251 for PCM data playback change in step S344 in the condition which can be read. As mentioned above, explanation of the read-out processing from the ring buffer 241 is ended.

[0298] It returns to drawing 67 . AIO MW94 makes the PCM data buffered by the buffer 251 for PCM data playback output to AD/DA62 in step S325. AD/DA62 makes the voice which starts playback of the inputted PCM data and corresponds output from a loudspeaker 2.

[0299] In step S326, CD RIPPING84 judges whether playback of the PCM data for one music was completed. When judged with return and subsequent processings being repeated by step S321, and playback of the PCM data for one music having not ended processing in step S326, when judged with playback of the PCM data for one music not being completed, monitor voice output processing is ended.

[0300] In addition, in step S322, when judged with the sound recording processing for one music to corresponding PCM data being completed, this monitor voice output processing is stopped immediately. As mentioned above, explanation of CD sound recording processing is ended.

[0301] In addition, in the process of CD sound recording processing, it corresponds to

the actuation to a user's recording carbon button 23 or high speed recording carbon button 24, and it is the timing of arbitration and can change from CD recording to CD recording conversely from CD ripping to CD ripping.

[0302] Here, the example of a display of the display 15 in case CD ripping is performed is shown in drawing 70 . Drawing 70 (A) is an example of a display of the information about a sound recording setup displayed just before sound recording is started. At this time, the display area 261 thru/or 267 are prepared in a display 15. In this example of a display, the information which shows a sound recording place a recording agency is displayed on the display area 261. The purport as which the information about a sound recording setup is displayed is displayed on the display area 262. The folder name which shows a preservation location is displayed on the display area 263. The album name and artist name of an album to record are displayed on the display area 264. The bit rate at the time of sound recording is displayed on the display area 265. The recording level at the time of sound recording is displayed on the display area 266. If the depression of playback / the pause button 26 is carried out, the purport by which sound recording is started will be displayed on the display area 267. The recording level at the time of sound recording is displayed.

[0303] Drawing 70 (B) is the example of a display of the midst by which sound recording is performed. At this time, the display area 271 thru/or 278 are prepared in a display 15. In this example of a display, the information which shows a sound recording place a recording agency is displayed on the display area 271. A flashing indication of the alphabetic character "under high-speed sound recording" which shows that it is during CD ripping is given in the display area 272. The album name and artist name of music under sound recording are displayed on the display area 273. The tune number number in the music CD 3 of the music under sound recording is displayed on the display area 274. The playback elapsed time of the music under sound recording is displayed on the display area 275. The playback residual time of music CD 3 is displayed on the display area 276. The progress bar 279 from which die length changes in proportion to the progress situation of sound recording over the total number of music to record is displayed on the display area 277. The total of the music to record and the number of the music under a sound recording settled or sound recording are shown in the display area 278.

[0304] For example, since sound recording is performed by about 5X when playback time amount is carrying out CD ripping of the all songs of the album which it is for 60 minutes, the die length of the progress bar 279 displayed on the display area 277 becomes gradually long from the time of initiation of sound recording, and turns into die length which occupies the whole display area 277 in about 12 minutes.

[0305] In addition, the die length of the progress bar 279 of the display area 277 is not doubled with the progress situation of sound recording, but is proportioned in the playback elapsed time of music, and you may make it expand it.

[0306] Next, how to reproduce the contents data recorded on HDD58 is explained with reference to drawing 71 thru/or drawing 77 . When making the music to reproduce specify, a user is made to specify the object of not a file but the folder which makes a layered structure, an album, and a truck, although the music currently recorded on music CD 3 is encoded and it is recording on HDD58 by considering contents data as a file in the audio server 1, as mentioned above.

[0307] It can also be specified as the music which bundles up two or more music and is reproduced by specifying the whole HDD, the folder of arbitration, or the album of arbitration as playback area. Playback of music is realized by decoding the contents data corresponding to the truck included in the play list created based on the specified playback area.

[0308] Drawing 71 shows an example of playback area. When the whole HDD surrounded with the broken line 281 is specified as playback area, as shown in drawing 72 , all the track numbers in HDD58 are registered into a play list.

[0309] When the my selection folder F1 surrounded with the broken line 282 is specified as playback area, as shown in drawing 73 , the album number of all the albums belonging to the my selection folder F1 is registered into a play list.

[0310] When the album A1 of the my selection folder F1 surrounded by the broken line 283 is specified as playback area, as shown in drawing 74 , the track number of all the trucks belonging to the album A1 of the my selection folder F1 is registered into a play list.

[0311] When specified as the music which the truck T1 of the album A1 belonging to the temporary folder F2 reproduces, as shown in drawing 75 , the truck T1 of the album A1 belonging to the temporary folder F2 is registered into a play list.

[0312] Next, the processing which creates the play list corresponding to the specified playback area is explained with reference to the flow chart of drawing 76 .

[0313] This play list creation processing is processing controlled by HD PLAY85 contained in HD MW82, and when a function button 12 is operated and a sound source is set as HDD, it is started.

[0314] In step S351, it judges whether the hierarchy of an object who shows the playback area where HD PLAY85 is chosen by the user is the whole HDD. When judged with the hierarchy of the object chosen not being the whole HDD, processing progresses to step S352. In addition, the approach a user chooses playback area is performed by whether the depression of the cursor carbon button 17 prepared in whether the playback area change carbon button (un-illustrating) prepared in the remote controller 7 is operated and a lid 40, the ENTA carbon button 20, the menu/Cancel button 21, etc. is carried out in predetermined sequence.

[0315] In step S352, HD PLAY85 judges whether the hierarchy of the object chosen by the user is a folder. When judged with the hierarchy of the object chosen not being a folder, processing progresses to step S353.

[0316] In step S353, the hierarchy of the object chosen by the user judges that HD PLAY85 is an album, and it progresses to step S354.

[0317] In step S354, HD PLAY85 judges whether playback / pause button 26 was operated. When judged with playback / pause button 26 having been operated, processing progresses to step S355. In step S355, when it judges with HD PLAY85 judging whether established [of the play list corresponding to the hierarchy of the object chosen] is carried out, and not carrying out established, it progresses to step S356. In addition, when judged with established being carried out, step S356 is skipped.

[0318] In step S356, HD PLAY85 creates a play list corresponding to the hierarchy of the object chosen.

[0319] In addition, in step S354, when judged with playback / pause button 26 not being operated, as for processing, return and subsequent processings are repeated by step S351.

[0320] Moreover, in step S351, when judged with the hierarchy of the object chosen being the whole HDD, or when it is judged with the hierarchy of the object chosen being a folder in step S352, processing progresses to step S354. As mentioned above, explanation of play list creation processing is ended.

[0321] In addition, you may make it read what corresponds among the play lists which create beforehand two or more play lists corresponding to various playback area assumed, and it is made to record on a predetermined location, and are created beforehand and recorded in the phase where playback area was specified by the user.

[0322] Next, the case where play mode is set as the all-songs repeat is explained to an example with reference to the flow chart of drawing 77 about the regeneration performed after termination of the play list creation processing mentioned above.

[0323] In step S361, HD PLAY85 judges whether reproductive termination was directed by operating an earth switch 25. When judged with reproductive termination not being directed, processing progresses to step S362. In step S362, one every truck of all the trucks included in a play list of HD PLAY85 is specified as a regenerative track one by one.

[0324] In step S363, HD PLAY85 reproduces the contents data corresponding to a regenerative track. The truck object corresponding to a regenerative track is specified based on CC data, the file identification child of the contents data which correspond based on the value of the file identification child record section 203 of the specified truck object is specified, and, specifically, contents data are read based on the specified file identification child (cluster number of = file record section 121). Next, the read contents data are decoded and outputted.

[0325] After playback of the contents data corresponding to a regenerative track is completed, as for processing, return and subsequent processings are repeated by step S361. Then, in step S361, when judged with reproductive termination having been directed by operating an earth switch 25, regeneration in case a playback mode is an

all-songs repeat is ended.

[0326] In addition, in playback modes other than an all-songs repeat, the approaches of assignment of playback area and a regenerative track only differ, and the procedure of the processing is the same.

[0327] Next, the contents data currently recorded on HDD58 of the audio server 1 are explained with reference to drawing 78 thru/or drawing 81 about the processing which carries out MUBU out to MS4.

[0328] The processing which carries out MUBU out of the contents data currently recorded on HDD58 to MS4 here is a series of processings in which the contents data currently recorded on HDD58 are deleted, after copying the contents data currently recorded on HDD58 to MS4.

[0329] MUBU out processing is explained with reference to the flow chart of drawing 78 . In addition, MUBU out processing is controlled by C IN/C OUT87 of HD MW82.

[0330] This MUBU out processing is in the condition that MS4 is inserted in the MS slot 45. A user operates a menu / Cancel button 21, and displays a menu. After operating the cursor carbon button 17 and choosing "edit", operate the ENTA carbon button 20 and an Edit menu is displayed. After operating the cursor carbon button 17 and choosing "MUBU out", operate the ENTA carbon button 20 and the cursor carbon button 17 and a select button 18 are operated further. After choosing the truck which carries out MUBU out, the list of trucks which operate and carry out MUBU out of en TAKI 20 is displayed, and it is started when en TAKI 20 is operated further.

[0331] In step S371, MS MW89 is requested from C IN/C OUT87, and copies the contents data which are recorded on HDD58 and which carry out MUBU out to MS4 as a right invalid data (unreproducible data). In addition, in order to consider as a right invalid data, the flag which shows the existence of a right contained in the attribute information on contents data is made off.

[0332] In step S372, C IN/C OUT87 generates the MUBU out hysteresis information which shows having started MUBU out processing, and records it on HDD58. The information which specifies the truck by which MUBU out is carried out is included in MUBU out hysteresis information. In step S373, C IN/C OUT87 makes the contents data of HDD58 a right invalid data by setting to OFF the flag which shows the existence of the right of the contents data currently recorded on HDD58.

[0333] In step S374, MS MW89 uses the contents data of MS4 as a right effective data by setting to ON the flag which shows the existence of the right of the contents data copied to MS4.

[0334] In step S375, C IN/C OUT87 deletes the contents data currently recorded on HDD58. In step S376, C IN / C OUT87 deletes the MUBU out hysteresis information created by processing of step S372.

[0335] Step S371 thru/or processing of S376 are performed to all the trucks with which step S371 explained above thru/or processing of S376 are MUBU out

processings of 1 contents data corresponding to one truck, and was chosen.

[0336] In addition, in order to compensate it, return processing makes it perform after a power-source return, when a power source intercepts in the middle of MUBU out processing and MUBU out processing is interrupted. In addition, about return processing, it mentions later with reference to drawing 86 thru/or drawing 88 .

[0337] Drawing 79 shows the state transition of MUBU out processing. A condition 1 is in the condition before MUBU out processing is started. that is, contents data record on HDD58 of the audio server 1 -- having -- **** -- the contents data of HDD58 -- a right -- the effective condition is shown.

[0338] A condition 2 is in the condition after processing of step S371 was performed. namely, the condition that contents data are recorded on the both sides of HDD58 and MS4 by copying the contents data currently recorded on HDD58 of the audio server 1 to MS4 -- it is -- and the contents data of HDD58 -- a right -- the condition that it is effective and the contents data of MS4 are a right invalid is shown.

[0339] A condition 3 is in the condition after processing of step S373 was performed. That is, the condition that it is in the condition that contents data are recorded on the both sides of HDD58 and MS4, and the contents data of HDD58 and the contents data of MS4 are right invalids is shown.

[0340] A condition 4 is in the condition after processing of step S374 was performed. namely, the condition that contents data are recorded on the both sides of HDD58 and MS4 -- it is -- and the contents data of HDD58 -- a right invalid -- it is -- the contents data of MS4 -- a right -- the effective condition is shown.

[0341] A condition 5 is in the condition after processing of step S375 was performed. namely, the condition that contents data are recorded only on MS4 by eliminating the contents data of HDD58 -- it is -- the contents data of MS4 -- a right -- the effective condition is shown.

[0342] Drawing 80 shows the example of a display of the display 15 when choosing the truck which carries out MUBU out. Only the music in which MUBU out is possible is displayed on a display 15.

[0343] Drawing 81 shows the example of a display of the display 15 of the midst on which MUBU out processing is performed. A flashing indication of alphabetic character "Move out" which shows that MUBU out processing is performing is given in the display area 291 of a display 15. A check mark 292 is displayed beside the truck which MUBU out completed. The information (total of the truck which carries out several/MUBU out in the truck which the inside of MUBU out or MUBU out completed) which shows the progress situation of MUBU out processing is displayed on the display area 293.

[0344] Next, the contents data currently recorded on MS4 are explained with reference to drawing 82 thru/or drawing 81 about the processing [MUBUIN / processing / HDD58 of the audio server 1].

[0345] The processing [MUBUIN / the contents data currently recorded on MS4 / here / processing / HDD58] is a series of processings in which the contents data currently recorded on MS4 are deleted, after copying the contents data currently recorded on MS4 to HDD58.

[0346] MUBUIN processing is explained with reference to the flow chart of drawing 82 . In addition, MUBUIN processing is controlled by C IN/C OUT87 of HD MW82.

[0347] This MUBUIN processing is in the condition that MS4 is inserted in the MS slot 45. A user operates a menu / Cancel button 21, and displays a menu. After operating the cursor carbon button 17 and choosing "edit", operate the ENTA carbon button 20 and an Edit menu is displayed. After operating the cursor carbon button 17 and choosing "MUBUIN", operate the ENTA carbon button 20 and the cursor carbon button 17 and a select button 18 are operated further. After choosing the contents data [MUBUIN / out of the contents data currently recorded on MS4 / data], The list of the contents data [MUBUIN / en TAKI 20 / data / operate and] is displayed, and it is started, when playback / pause button 26 is operated after operating en TAKI 20 further.

[0348] In step S381, MS MW89 is requested from C IN / C OUT87, and copies the contents data [MUBUIN / data] which are recorded on MS4 to HDD58 as a right invalid data.

[0349] In step S382, C IN/C OUT87 generates the MUBUIN hysteresis information which shows having started MUBUIN processing, and records it on HDD58. The information which specifies the contents data [MUBUIN / data] is included in MUBUIN hysteresis information. In step S383, MS MW89 makes the contents data of MS4 a right invalid data by setting to OFF the flag which shows the existence of the right of the contents data currently recorded on MS4.

[0350] In step S384, C IN/C OUT87 uses the contents data of HDD58 as a right effective data by setting to ON the flag which shows the existence of the right of the contents data copied to HDD58.

[0351] In step S385, C IN/C OUT87 is requested from MS MW89, and deletes the contents data currently recorded on MS4. In step S386, C IN/C OUT87 deletes the MUBUIN hysteresis information created by processing of step S382.

[0352] Step S381 thru/or processing of S386 are performed to all the trucks with which step S381 explained above thru/or processing of S386 are MUBUIN processings of 1 contents data corresponding to one truck, and was chosen.

[0353] In addition, when a power source intercepts in the middle of MUBUIN processing and MUBUIN processing is interrupted, in order to compensate it, return processing is performed after a power-source return.

[0354] Drawing 83 shows the state transition of MUBUIN processing. A condition 11 is in the condition before MUBUIN processing is started. that is, contents data record on MS4 -- having -- **** -- the contents data of MS4 -- a right -- the effective

condition is shown.

[0355] A condition 12 is in the condition after processing of step S381 was performed. namely, the condition that contents data are recorded on the both sides of MS4 and HDD58 by copying the contents data currently recorded on MS4 to HDD58 -- it is -- and the contents data of MS4 -- a right -- the condition that it is effective and the contents data of HDD58 are a right invalid is shown.

[0356] A condition 12 is in the condition after processing of step S381 was performed. namely, the condition that contents data are recorded on the both sides of MS4 and HDD58 by copying the contents data currently recorded on MS4 to HDD58 -- it is -- and the contents data of MS4 -- a right -- the condition that it is effective and the contents data of HDD58 are a right invalid is shown.

[0357] A condition 13 is in the condition after processing of step S383 was performed. That is, the condition that it is in the condition that contents data are recorded on the both sides of MS4 and HDD58, and the contents data of MS4 and the contents data of HDD58 are right invalids is shown.

[0358] A condition 14 is in the condition after processing of step S384 was performed. namely, the condition that contents data are recorded on the both sides of MS4 and HDD58 -- it is -- and the contents data of MS4 -- a right invalid -- it is -- the contents data of HDD58 -- a right -- the effective condition is shown.

[0359] A condition 15 is in the condition after processing of step S385 was performed. namely, the condition that contents data are recorded only on HDD58 by eliminating the contents data of MS4 -- it is -- the contents data of HDD58 -- a right -- the effective condition is shown.

[0360] Drawing 84 shows the example of a display of the display 15 when choosing the contents data [MUBUIN / data]. Only the contents data in which MUBU out is possible among the contents data currently recorded on MS4 are displayed on a display 15.

[0361] Drawing 81 shows the example of a display of the display 15 of the midst on which MUBUIN processing is performed. A flashing indication of alphabetic character "Move in" which shows that MUBUIN processing is performing is given in the display area 301 of a display 15. A check mark 302 is displayed beside the contents data which MUBUIN completed. The information (total of the contents data [MUBUIN / the contents data which the inside of MUBUIN or MUBUIN completed / data / several/]) which shows the progress situation of MUBUIN processing is displayed on the display area 303.

[0362] As mentioned above, although MUBUIN processing was explained, the processing which imports contents data from MS4 to HDD58 is processed similarly. The treatment of the contents data recorded on HDD58 by MUBUIN processing or import processing has a difference of MUBUIN processing and import processing.

[0363] The audio server 1 can carry out MUBU out of the contents data recorded on

HDD58 by MUBUIN processing to other MSs4, PDs5, etc., and can be checked out. However, the audio server 1 is impossible for carrying out MUBU out, although it is possible to check out the contents data recorded on HDD58 by import processing to other MSs4, PDs5, etc.

[0364] Next, the return processing for compensating that the power source intercepted in the middle of MUBU out processing or MUBUIN processing, and the processing was interrupted is explained with reference to drawing 86 . This return processing is immediately started by C IN/C OUT87 after power-source restoration.

[0365] In step S391, C IN/C OUT87 judges whether MUBU out hysteresis information exists in HDD58. When judged with MUBU out hysteresis information existing in HDD58, in order to compensate that MUBU out processing was interrupted, processing progresses to step S392.

[0366] In step S392, C IN/C OUT87 performs MUBU out restoration processing. MUBU out restoration processing is explained with reference to the flow chart of drawing 87 .

[0367] In step S401, C IN/C OUT87 judges whether the contents data of HDD58 are a right invalid. When judged with the contents data of HDD58 being a right invalid, processing progresses to step S402.

[0368] In step S402, C IN/C OUT87 deletes the contents data which exist in HDD58. In addition, in step S401, when judged with the contents data of HDD58 not being a right invalid, step S402 is skipped.

[0369] In step S403, C IN/C OUT87 deletes the MUBU out hysteresis information on HDD58.

[0370] Processing returns to drawing 86 . In step S393, C IN/C OUT87 judges whether MUBUIN hysteresis information exists in HDD58. When judged with MUBUIN hysteresis information existing in HDD58, in order to compensate that MUBUIN processing was interrupted, processing progresses to step S394.

[0371] In step S394, C IN/C OUT87 performs MUBUIN restoration processing. MUBU out restoration processing is explained with reference to the flow chart of drawing 88 .

[0372] In step S421, C IN/C OUT87 judges whether the contents data of HDD58 are a right invalid. When judged with the contents data of HDD58 being a right invalid, processing progresses to step S422.

[0373] In step S422, C IN/C OUT87 deletes the contents data which exist in HDD58. In addition, in step S421, when judged with the contents data of HDD58 not being a right invalid, step S422 is skipped.

[0374] In step S423, C IN/C OUT87 deletes the MUBUIN hysteresis information on HDD58. As mentioned above, explanation of MUBUIN restoration processing is ended. Return and return processing are ended for processing by drawing 86 .

[0375] In addition, in step S391 of drawing 86 , since MUBU out processing is normally ended when judged with MUBU out hysteresis information not existing in HDD58,

processing of step S392 is skipped. Moreover, in step S393, since MUBUIN processing is normally ended when judged with MUBUIN hysteresis information not existing in HDD58, processing of step S394 is skipped.

[0376] Moreover, since it performs from step S391 again after power-source restoration even if return processing is interrupted by the power-source cutoff back, the compensation will be made. As mentioned above, explanation of return processing is ended.

[0377] Next, the contents data currently recorded on HDD58 of the audio server 1 are explained with reference to drawing 89 thru/or drawing 91 about the processing which he checks out to MS4.

[0378] The processing which checks out the contents data currently recorded on HDD58 here is processing for creating temporarily the contents copy of data currently recorded on HDD58 to MS4 etc., and using it for it. The count of contents data which can be checked out is set up beforehand and the count which decreased and which can be checked out is restored every [1] by performing check-in processing of check-out processing later mentioned although the count which can be checked out therefore decreases every [1].

[0379] Check-out processing is explained with reference to the flow chart of drawing 89 . In addition, check-out processing is controlled by C IN/C OUT87 of HD MW82.

[0380] After operating the ENTA carbon button 20, displaying an Edit menu, operating the cursor carbon button 17, after being in the condition that MS4 is inserted in the MS slot 45, a user's operating a menu / Cancel button 21, displaying a menu, operating the cursor carbon button 17 and choosing "edit", and choosing "check-out", this check-out processing is started when the ENTA carbon button 20 is operated.

[0381] In step S441, C IN/C OUT87 acquires the count (count of the check-out remainder) of the contents data corresponding to all the trucks that control HS DB91 and belong to the album by which current selection is made which can be checked out. The count of contents data which can be checked out is recorded on CN contained in AC (drawing 42) of a corresponding truck object (drawing 43).

[0382] In step S442, C IN/C OUT87 is requested from related firmware, and the count which can be checked out displays on a display 15 the information (a music title, count which can be checked out) about a certain truck one or more. Drawing 90 shows the example of a display of a display 15. "HDD" is displayed on the display area 311 of a display 15 as information which shows the sound source of check-out. The display of the display area 312 shows the count of the contents data corresponding to each truck which can be checked out.

[0383] In step S443, C IN/C OUT87 judges whether the truck which he checks out among the displayed trucks which can be checked out was chosen, when a user operates the cursor carbon button 17 and a select button 18. When judged with having chosen the truck to check out, processing progresses to step S444.

[0384] In step S444, C IN/C OUT87 adds the selected truck to a check-out list. In step S445, only 1 carries out the decrement of the display of the count of the contents data to the truck with which C IN/C OUT87 was chosen which can be checked out. As for processing, return and subsequent processings are repeated by step S441.

[0385] In addition, in step S443, when judged with the truck to check out not being chosen, processing progresses to step S446. In step S446, C IN/C OUT87 judges whether activation of check-out was directed by displaying the list of trucks to check out and operating en TAKI 20 further, when a user operates en TAKI 20. When judged with activation of check-out not being directed, as for processing, return and subsequent processings are repeated by step S441.

[0386] Then, in step S446, when judged with activation of check-out having been directed, processing progresses to step S447. CIN/C OUT87 makes the contents data which read the contents data corresponding to the truck included in a check-out list from HDD58, and were requested and read to MS MW89 copy to MS4 in step S447. In addition, the information which specifies HDD58 which is a checking out agency is included in a contents copy of data.

[0387] In step S448, only 1 carries out the decrement of the count which is recorded on CN of AC of the truck object corresponding to the copied contents data and which can be checked out, and C IN/C OUT87 updates the value of CN. Moreover, C IN/C OUT87 records the information which specifies MS4 as LCMLOG of AC as information on a check-out place.

[0388] In addition, although explanation is omitted, also in this check-out processing, compensation of power-source cutoff etc. and creation of an unjust copy are inhibited by using the flag which shows reproductive propriety (the validity of a right, or invalid) like the MUBU out processing mentioned above.

[0389] Drawing 91 shows the example of a display of the display 15 of the midst on which check-out processing is performed. A flashing indication of alphabetic character "Check out" which shows that it is under check-out is given in the display area 321. A check mark 322 is displayed beside the truck which check-out completed. A pointer 323 is displayed beside the truck under current check-out. The information (total of the contents data contained in several/check-out list of the contents data which check-out during check-out completed) which shows the progress situation of check-out processing is displayed on the display area 324. As mentioned above, explanation of check-out processing is ended.

[0390] Next, the contents data checked out to MS4 are explained with reference to drawing 92 and drawing 93 about the processing which checks in at HDD58.

[0391] The processing which checks out the contents data currently recorded on MS4 here is processing which only 1 increments the count of HDD58 which can be checked out and restores the count which can be checked out to the original value

while eliminating the contents copy of data temporarily reproduced to MS4 from HDD58.

[0392] Check-in processing is explained with reference to the flow chart of drawing 92 . In addition, check-in processing is controlled by C IN/C OUT87 of HD MW82.

[0393] After operating the ENTA carbon button 20, displaying an Edit menu, operating the cursor carbon button 17, after being in the condition that MS4 is inserted in the MS slot 45, a user's operating a menu / Cancel button 21, displaying a menu, operating the cursor carbon button 17 and choosing "edit", and choosing "check-in", this check-in processing is started when the ENTA carbon button 20 is operated.

[0394] In step S451, C IN/C OUT87 is requested from MS MW89, identifies the contents data (contents data with which HDD58 of the audio server 1 was checked out) among the data currently recorded on MS4 which can be checked in, requests them from related firmware, and displays on a display 15 the information on the contents data at which he can check in.

[0395] In step S452, C IN / C OUT87 displays on a display 15 the information (music title etc.) about the truck at which he can check in. Drawing 93 shows the example of a display of a display 15. "MS" is displayed on the display area 331 of a display 15 as information which shows the sound source of check-in. The arrow head 332 displayed after information, such as a music title name of contents data, shows that he can check in at the contents data concerned.

[0396] In step S452, C IN/C OUT87 judges whether the contents data at which he checks in among the displayed contents data which can be checked in were chosen, when a user operates the cursor carbon button 17 and a select button 18. When judged with having chosen the contents data at which he checks in, processing progresses to step S453.

[0397] In step S453, C IN/C OUT87 adds selected contents data to a check-in list. As for processing, return and subsequent processings are repeated by step S451.

[0398] In addition, in step S452, when judged with the contents data at which he checks in not being chosen, processing progresses to step S454. In step S454, C IN/C OUT87 judges whether activation of check-in was directed by displaying the list of the contents data at which he checks in, and operating en TAKI 20 further, when a user operates en TAKI 20. When judged with activation of check-in not being directed, as for processing, return and subsequent processings are repeated by step S451.

[0399] Then, in step S454, when judged with activation of check-in having been directed, processing progresses to step S455. In step S455, C IN/C OUT87 is requested from MS MW89, and the contents data of MS4 contained in a check-in list are eliminated (good [to also make into no i.e., a right invalid, the flag which shows reproductive propriety]).

[0400] In step S456, only 1 increments the count which is recorded on CN of AC of the truck object corresponding to the contents data of the origin currently recorded

on HDD58 and which can be checked out, and C IN/C OUT87 updates the value of CN. Moreover, C IN/C OUT87 deletes the information which specifies MS4 which was being recorded as information on a check-out place from LCMLOG of AC. As mentioned above, explanation of check-in processing is ended.

[0401] Next, the exchange processing which performs continuously processing which bundles up the processing which checks in at the contents data currently recorded on MS4, and two or more trucks belonging to the album with which the truck reproduced at the end by HD play function is included, and he checks out to MS4 is explained with reference to drawing 94 thru/or drawing 97 .

[0402] This exchange processing is in the condition that MS4 was inserted in the MS slot 45, and when a user operates the exchange carbon button 22, it is started.

[0403] In step S461, C IN/C OUT87 is requested from MS MW89, and identifies the contents data among the data currently recorded on MS4 which can be checked in. In step S462, C IN/C OUT87 cooperates with MS MW89, and he checks in at it like the check-in processing which mentioned above the contents data which can check in MS4 with reference to every [1 contents data] and drawing 92 .

[0404] Drawing 95 shows the example of a display of the display 15 of the midst on which processing of step S462 is performed. "MS" is displayed on the display area 381 of a display 15 as information which shows the sound source of check-in. A flashing indication of alphabetic character "Now Check in" which shows that check-in is performing is given in the display area 382. The "x" mark 383 displayed before information, such as a music title name of contents data, shows that he cannot check in at the contents data concerned. It is shown that check-in of the contents data concerned has completed the check mark 384. It is shown that check-in of the contents data concerned is performing a pointer 385.

[0405] In step S463, C IN/C OUT87 judges whether he checked in at all the contents data that can check in MS4. When not judged with having checked in at all the contents data that can check in MS4, return and the following contents data check in at processing at step S462. Then, in step S463, when judged with having checked in at all the contents data that can check in MS4, processing progresses to step S464.

[0406] In step S464, C IN/C OUT87 determines the album which cooperates with HD DB91 and checks out the truck which belongs collectively. The truck with which HD DB91 was specifically reproduced at the end based on the last access time (drawing 42) of each truck object currently recorded on the object record section 122 is distinguished, and it is decided that it will be the album which checks out the album with which the truck belongs.

[0407] In step S465, C IN/C OUT87 chooses one truck (namely, contents data) from the album to check out. In step S466, it judges whether C IN / C OUT87 can check out selected contents data. When judged [that he can check out selected contents data and], processing progresses to S467.

[0408] C IN / C OUT87 is requested from MS MW89, and makes it judge in step S467 whether only the capacity which checks out selected contents data is vacant in MS4. When judged with only the capacity which checks out selected contents data being vacant in MS4, processing progresses to step S468.

[0409] In step S468, he checks out C IN/C OUT87 like the check-out processing which mentioned selected contents data above with reference to drawing 89 .

[0410] Drawing 96 shows the example of a display of the display 15 of the midst on which processing of step S468 is performed. "HDD" is displayed on the display area 391 of a display 15 as information which shows the sound source of check-out. A flashing indication of alphabetic character "Now Check out" which shows that check-out is performing is given in the display area 392. It is shown that "x" mark displayed before information, such as a music title name of contents data, cannot check out the contents data concerned, and it is shown that check-out of the contents data concerned has completed the check mark.

[0411] In step S469, C IN/C OUT87 judges whether all the trucks (namely, contents data) included in the album to check out were chosen at step S465. When judged with having chosen no contents data at step S465, return and subsequent processings are repeated by processing at step S465, and in step S469, when judged with having chosen all contents data at step S465, exchange processing is ended.

[0412] in addition, in step S466, when you can check out selected contents data and it is judged with 7s **, steps S467 and S468 are skipped. Moreover, in step S467, when judged with only the capacity which checks out selected contents data not being vacant in MS4, step S468 is skipped.

[0413] Drawing 97 shows the example of a display of the display 15 immediately after completing exchange processing. Alphabetic character "COMPLETE" which shows that exchange processing was completed is displayed on the display area 401 of a display 15.

[0414] As explained above, a user only operates the exchange carbon button 22, and it becomes possible from MS4 to make it perform automatically with the check-in processing to HDD58 and the check-out processing to MS4 from HDD58 of him. As mentioned above, explanation of exchange processing is ended.

[0415] By the way, the MUBU out processing mentioned above, MUBUIN processing, import processing, check-out processing, and check-in processing can be performed also not only between between HDD58 and MS4 but between PDs5 connected to HDD58 and a connector 43.

[0416] The hardware example of a configuration of PD5 is shown in drawing 98 . LSI (Large Scale Integration)410 which realizes PD5 builds in CPU411 which controls the whole. ROM412, RAM413, DMA controller 414, DSP (Digital Signal Processor)415, a buffer 416, the LCD interface (I/F) 417, serial interface (I/F) 418, and an interface 419,420 are connected to CPU411 through the bus 421.

[0417] A program, Device ID, a code key, etc. which realize various kinds of functions of PD5 are memorized by ROM412. RAM413 memorizes predetermined data and a predetermined program temporarily, in case CPU411 performs various kinds of processings. DMA controller 414 controls the data transfer between a buffer 416, a flash memory 426, and the USB controller 424 through serial interface 418. DSP415 decodes the contents data currently recorded on the flash memory 426 etc. Moreover, DSP415 has the DES engine and performs a contents data encryption / decode using a code key. A buffer 416 buffers temporarily the data with which DMA controller 417 controls a transfer.

[0418] The LCD driver 422 and LCD423 are connected to the latter part of the LCD interface 417. The USB controller 424 and the USB connector 425 are connected to the latter part of serial interface 418. The USB controller 424 controls data communication with the audio server 1 connected through the USB connector 425. The contents data with which MUBU out etc. was carried out from the audio server 1, and additional information, such as the music title, are recorded on the flash memory 426 connected through an interface 419. DAC427 and amplifier (AMP) 428 are connected to the latter part of an interface 420. A power supply section 429 supplies electric power to LSI410.

[0419] The audio data obtained by decoding of DSP415 are outputted to headphone etc. through an interface 420, DAC427, and amplifier (AMP) 428.

[0420] Since the MUBU out processing between HDD58 and MS4, etc. the MUBU out processing between HDD58 and PD5, etc. are almost the same, the difference is explained.

[0421] the code key as the contents data encryption currently recorded on HDD58 of the audio server 1 with the same contents data encryption recorded on MS4 -- it is carried out. Therefore, between HDD58 and MS4, MUBU out can be carried out in the condition as it is, without decoding the enciphered contents data.

[0422] A different code key from the contents data encryption by which the contents data encryption recorded on PD5 is recorded on HDD58 of the audio server 1 is used to it. Therefore, between HDD58 and PD5, as mentioned above with reference to drawing 56 , the code of the contents data currently recorded on HDD58 is decoded, and it is made to carry out MUBU out of the contents again enciphered using a different code key for PD5.

[0423] As mentioned above, the explanation about the MUBU out processing, the MUBUIN processing, the import processing, check-out processing, and check-in processing between HDD58 and PD5 is ended.

[0424] Next, the actuation of HD DB91 in the case of changing the count counter of playback of a truck object (drawing 42) is explained with reference to the flow chart of drawing 99 .

[0425] In step S501, HD DB91 measures the playback time amount of contents data,

when it stands by until contents data were reproduced, and contents data are reproduced.

[0426] Next, in step S503, HD DB91 changes the count counter of playback of the truck object corresponding to the reproduced contents data based on the playback time amount of the measured contents data. The detail of processing here is shown in the flow chart of drawing 100 .

[0427] That is, although HD DB91 has the playback time amount of contents data longer than the predetermined time amount T1, when it judges whether it is no and judges with it being longer than it, it progresses to step S512 and only 1 makes the count counter of playback of a truck object increase in step S511. Then, processing is ended.

[0428] On the other hand, at step S511, when judged with playback time amount being less than [time amount T1], processing of step S512 is skipped and processing is ended.

[0429] That is, it is not regarded as that by which those contents were reproduced when the contents which were wrong, for example although the count counter of playback increased as that by which contents were reproduced when playback time amount was more than time amount T1 in this case were reproduced, the user had recognized it and playback was suspended less than [time amount T1], but becomes that the count counter of playback remains as it is.

[0430] The flow chart of drawing 101 shows other procedures of processing of step S503 of drawing 99 . In this case, at step S521, when HD DB91 judges whether the playback time amount of contents data is longer than time amount T1 and judges with it being longer than it, it progresses to step S522 and playback time amount judges whether it is longer than time amount T2 (> time amount T1).

[0431] When it judges that playback time amount is longer than time amount T2, it progresses to step S523, and only 1 makes the count counter of playback of the truck object corresponding to the contents data with which HD DB91 was reproduced increase at step S522.

[0432] At step S522, when judged with playback time amount being less than [time amount T2], playback time amount is longer than time amount T1 after all, when it is less than [time amount T2], it progresses to step S524, and HD DB91 decreases [1] the count counter of playback.

[0433] For example, although the reproduced contents mistook and there were then, when it is recognized as it being what does not suit liking, and a user stops the playback before passing time amount T2, as for the count counter of playback, only 1 decreases. [no]

[0434] When judged with playback time amount being less than [time amount T1] at step S521, when the count counter of playback is changed, processing is ended at step S523 or step S524.

[0435] That is, when in the case of this example (for example, after reproducing) it has recognized having reproduced the contents which were wrong in the user and that playback is suspended less than [time amount T1], like the time in drawing 100 , that by which those contents were reproduced is not carried out, but the count counter of playback becomes remaining as it is. Moreover, when liking of a user is suited and it is reproduced two or more [time amount T] for example, only 1 increases the count counter of playback.

[0436] On the other hand, it reproduces and it turns out that it is what does not suit liking although it was heard more than time amount T1, for example, and when the user suspends the playback before passing time amount T2, as for the count counter of playback corresponding to contents data, only 1 decreases.

[0437] In addition, when processing of step S522 is omitted and the judgment of NO is made at step S521, processing of step S524 can also be performed. That is, when it is less than [playback time amount T1], only in 1, the count counter of playback decreases.

[0438] Drawing 102 shows the procedure of the list creation processing based on the count counter of playback changed as mentioned above. The count counter of playback corresponding to a contents name as shown in drawing 103 , and its contents was shown in an order from the smaller one of the count counter of playback, and the list created here is called bottom (Bottom) 100 list as a list of [for 100 music] from the direction with few the case of this example, for example, the count counter of playback.

[0439] As mentioned above, the count counter of playback increases in connection with the count whose playback time amount was more than predetermined time T2, and its playback time amount of contents is longer than time amount T1, and it decreases in connection with the count which was less than [time amount T2], or the count which was less than [time amount T1]. That is, it is seldom reproduced or does not suit [it is fond and], but in order to recommend elimination of contents with the small count counter of playback by short playback being performed, such contents are shown in bottom 100 list.

[0440] In addition, list creation processing is performed by HD MW82.

[0441] In step S531, it stands by until it judges with HD MW82 being timing which creates a list, and when it judges with it being the timing, it progresses to step S532.

[0442] The timing which creates a list is a time of a user (for example, user who is the information displayed separately and checked remaining capacity) performing actuation for eliminating contents data to the audio server 1 (for example, when the remaining capacity of the storage capacity of HDD58 becomes below predetermined, or when remaining capacity turns into 5% or less of the whole storage capacity).

[0443] In step S532, HD MW82 detects the count counter of playback of the existing truck object through HD DB91, and creates a list as shown in drawing 103 in step

S533 based on the detection result.

[0444] In step S534, the list created at step S533 is displayed on a display 15. Then, processing is ended. A user chooses the contents eliminated from there with reference to the list displayed by doing in this way, and performs actuation which eliminates it to the audio server 1.

[0445] By the way, a series of processings mentioned above are realizable also by installing and performing firmware as shown in the general-purpose personal computer etc. at drawing 7 , although it can also be made to perform by exclusive device like the audio server 1.

[0446] Apart from a general-purpose computer, this firmware is distributed in order to provide a user with a program. The magnetic disk with which firmware is recorded (a floppy disk is included), an optical disk (CD-ROM (Compact Disc-Read Only Memory) --) DVD (Digital Versatile Disc) is included. It is not only constituted by the package media which consist of a magneto-optic disk (MD (Mini Disc) is included) or semiconductor memory, but It consists of ROMs, hard disks, etc. with which a user is provided in the condition of having been beforehand included in the computer and with which firmware is recorded.

[0447] In addition, in this specification, even if the processing serially performed according to the sequence that the step which describes a program (firmware) was indicated is not of course necessarily processed serially, it is a juxtaposition thing also including the processing performed according to an individual.

[0448]

[Effect of the Invention] The data which were chosen as the 1st regenerative apparatus of this invention and the approach, and the list according to actuation by the user according to the program are reproduced, the count of playback of data is changed based on playback time amount, and since the information showing data was shown to the user based on the count of playback, useful information can be shown to a user when choosing the data which should be eliminated for example.

[0449] The contents data which were chosen as the 2nd regenerative apparatus of this invention and the approach, and the list according to actuation by the user according to the program are reproduced, the count of playback of contents data is changed based on playback time amount, and since the information showing contents data was shown to the user based on the count of playback, useful information can be shown to a user when choosing the data which should be eliminated for example.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing for explaining the outline of the audio server 1 which is the gestalt of 1 operation of this invention.
[Drawing 2] It is the external view of the audio server 1.
[Drawing 3] It is the plan of the audio server 1.
[Drawing 4] It is the rear view of the audio server 1.
[Drawing 5] It is the front view of the audio server 1.
[Drawing 6] It is the block diagram showing the hardware example of a configuration of the audio server 1.
[Drawing 7] It is drawing showing the firmware which the audio server 1 performs.
[Drawing 8] It is drawing for explaining the FAT mold file system (data format) applied to HDD58.
[Drawing 9] It is drawing showing the logical structure of the file record section 121.
[Drawing 10] It is drawing showing the configuration of FAT141.
[Drawing 11] It is drawing showing an example of FAT141.
[Drawing 12] It is drawing showing an example of record of the file record section 121.
[Drawing 13] It is drawing showing the configuration of the size record section 151.
[Drawing 14] It is a flow chart explaining file creation processing.
[Drawing 15] It is a flow chart explaining empty cluster acquisition processing.
[Drawing 16] It is a flow chart explaining FAT entry reading processing.
[Drawing 17] It is a flow chart explaining connection processing.
[Drawing 18] It is a flow chart explaining read-out processing of File X.
[Drawing 19] It is a flow chart explaining retrieval processing of File X.
[Drawing 20] It is a flow chart explaining reverse read-out processing of File X.
[Drawing 21] It is drawing showing the logical structure of the object record section 122.
[Drawing 22] It is drawing showing the configuration of the object mold record section 163.
[Drawing 23] It is drawing for explaining the field information record section 164.
[Drawing 24] It is drawing showing the configuration of the object management section 124.
[Drawing 25] It is drawing showing the configuration of the session management information 181.
[Drawing 26] It is drawing showing two kinds of basic object molds.
[Drawing 27] It is drawing showing the configuration of an object identifier.
[Drawing 28] It is a flow chart explaining object creation processing.
[Drawing 29] It is a flow chart explaining session establishment processing.
[Drawing 30] It is a flow chart explaining vacant entry secured processing.
[Drawing 31] It is a flow chart explaining light session decision processing.
[Drawing 32] It is a flow chart explaining session cancellation processing.
[Drawing 33] It is a flow chart explaining object retrieval processing.

[Drawing 34] It is a flow chart explaining entry acquisition processing.
[Drawing 35] It is a flow chart explaining an object update process.
[Drawing 36] It is a flow chart explaining stream object creation processing.
[Drawing 37] It is a flow chart explaining stream object retrieval processing.
[Drawing 38] It is drawing showing the directory structure of an object.
[Drawing 39] It is drawing showing a format of a folder list object.
[Drawing 40] It is drawing showing a format of a folder object.
[Drawing 41] It is drawing showing a format of an album object.
[Drawing 42] It is drawing showing a format of a truck object.
[Drawing 43] It is drawing showing the detail of AC of a truck object.
[Drawing 44] It is drawing showing a format of contents data.
[Drawing 45] It is drawing showing a format of CC object.
[Drawing 46] It is drawing showing a format of CC data.
[Drawing 47] It is drawing showing the data flow at the time of CD ripping being performed.
[Drawing 48] It is drawing showing the data flow at the time of CD recording being performed.
[Drawing 49] It is drawing showing the data flow at the time of HD recording to a digital input being performed.
[Drawing 50] It is drawing showing the data flow at the time of HD recording to an analog input being performed.
[Drawing 51] It is drawing showing the data flow at the time of HD play being performed.
[Drawing 52] It is drawing showing the data flow at the time of CD play being performed.
[Drawing 53] It is drawing showing the data flow at the time of MS play being performed.
[Drawing 54] It is drawing showing the data flow at the time of MS check-out / MUBU out being performed.
[Drawing 55] It is drawing showing the data flow at the time of MS import / MUBUIN being performed.
[Drawing 56] It is drawing showing the data flow at the time of PD check-out being performed.
[Drawing 57] It is drawing for explaining CD ripping.
[Drawing 58] It is drawing for explaining CD recording.
[Drawing 59] It is drawing for explaining division of the buffer 56 in CD ripping or CD recording.
[Drawing 60] It is drawing showing the state transition of each buffer.
[Drawing 61] It is drawing showing the ring buffer 241 formed in HDD58.
[Drawing 62] It is drawing for explaining the data flow between each buffer at the time

of CD ripping.

[Drawing 63] It is a flow chart explaining sound recording rate setting processing.

[Drawing 64] It is a flow chart explaining CD sound recording processing.

[Drawing 65] It is a flow chart explaining ring buffer information initialization processing.

[Drawing 66] It is a flow chart explaining the sound recording processing for one music.

[Drawing 67] It is a flow chart explaining monitor voice output processing.

[Drawing 68] It is a flow chart explaining the write-in processing to a ring buffer.

[Drawing 69] It is a flow chart explaining the read-out processing to a ring buffer.

[Drawing 70] It is drawing showing the example of a display of the display 15 under CD ripping.

[Drawing 71] It is drawing for explaining a setup of playback area.

[Drawing 72] It is drawing showing an example of a play list.

[Drawing 73] It is drawing showing an example of a play list.

[Drawing 74] It is drawing showing an example of a play list.

[Drawing 75] It is drawing showing an example of a play list.

[Drawing 76] It is a flow chart explaining play list creation processing.

[Drawing 77] It is a flow chart explaining regeneration of an all-songs repeat.

[Drawing 78] It is a flow chart explaining MUBU out processing.

[Drawing 79] It is drawing showing the state transition of MUBU out processing.

[Drawing 80] It is drawing showing the example of a display of the display 15 in MUBU out processing.

[Drawing 81] It is drawing showing the example of a display of the display 15 in MUBU out processing.

[Drawing 82] It is a flow chart explaining MUBUIN processing.

[Drawing 83] It is drawing showing the state transition of MUBUIN processing.

[Drawing 84] It is drawing showing the example of a display of the display 15 in MUBUIN processing.

[Drawing 85] It is drawing showing the example of a display of the display 15 in MUBUIN processing.

[Drawing 86] It is a flow chart explaining return processing.

[Drawing 87] It is a flow chart explaining MUBU out restoration processing.

[Drawing 88] It is a flow chart explaining MUBUIN restoration processing.

[Drawing 89] It is a flow chart explaining check-out processing.

[Drawing 90] It is drawing showing the example of a display of the display 15 in check-out processing.

[Drawing 91] It is drawing showing the example of a display of the display 15 in check-out processing.

[Drawing 92] It is a flow chart explaining check-in processing.

[Drawing 93] It is drawing showing the example of a display of the display 15 in

check-in processing.

[Drawing 94] It is a flow chart explaining exchange processing.

[Drawing 95] It is drawing showing the example of a display of the display 15 in exchange processing.

[Drawing 96] It is drawing showing the example of a display of the display 15 in exchange processing.

[Drawing 97] It is drawing showing the example of a display of the display 15 in exchange processing.

[Drawing 98] It is the block diagram showing the hardware example of a configuration of PD5.

[Drawing 99] It is a flow chart explaining modification processing of the count counter of playback.

[Drawing 100] It is a flow chart for explaining processing of step S503 of drawing 99 .

[Drawing 101] It is a flow chart for explaining other processings of step S503 of drawing 99 .

[Drawing 102] It is a flow chart explaining list creation processing.

[Drawing 103] It is drawing showing the example of a list.

[Description of Notations]

1 Audio Server 2 Loudspeaker, 3 Music CD 4 MS 5PD, 6 PC 22 An exchange carbon button, 51 Maine CPU and 71RTOS 72 APP 73 UMW, 74 LMW 75 DD 76 Maine APP 77 HD APP 78 CD APP 79 MS APP 80 PDAPP 81 FEP 82 HD MW, 83 HD CC 84 CD RIPPING 85HD PLAY 86 HD REC 87 C IN/C OUT 88 CD MW 89MS MW 90 PD MW